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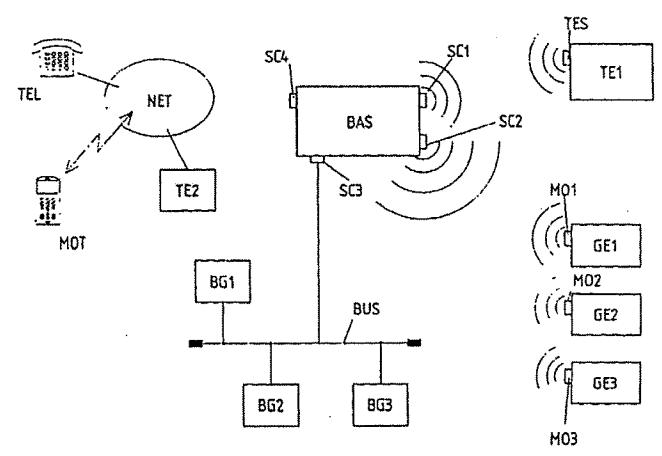
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(54) Title: DEVICE FOR SWITCHING, CONTROLLING AND MONITORING APPLIANCES

(54) Bezeichnung: VORRICHTUNG ZUM SCHALTEN, STEuern UND ÜBERWACHEN VON GERÄTEN

(57) Abstract

The invention relates to a device for switching, controlling and monitoring appliances, especially appliances located in residential or commercial buildings, that is comprised of a base station (BAS) which is provided with at least one processor and one memory and which has one or more interfaces (SC1 - SC4) via which appliances (GE1 - GE3, BG1 - BG3) can be electrically connected to the base station (BAS). The inventive device is also comprised of at least one terminal (TE1, TE2) that is assigned to the base station (BAS). The base station (BAS) serves to transmit control signals to appliances (GE1 - GE3, BG1 - BG3) as well as to receive information signals from appliances (GE1 - GE3, BG1 - BG3). The base station (BAS) also serves to freely configure scenarios which affect switching and controlling processes carried out on any of the appliances (GE1 - GE3, BG1 - BG3). Scenarios can be activated by activation signals transmitted to the base station (BAS), whereby, after a scenario has been activated, the relevant appliances (GE1 - GE3, BG1 - BG3) are switched and/or controlled by control signals transmitted by the base station (BAS). The terminal (TE1, TE2) serves to transmit activation signals to the base station (BAS) and to receive status signals from the base station (BAS).



(57) Zusammenfassung

Eine Vorrichtung zum Schalten, Steuern und Überwachen von Geräten, insbesondere von Geräten in Wohn- oder Nutzbauten, besteht aus einer Basisstation (BAS) mit zumindest einem Prozessor und einem Speicher, welche eine oder mehrere Schnittstellen (SC1 – SC4) aufweist, über welche Geräte (GE1 – GE3, BG1 – BG3) mit der Basisstation (BAS) elektrisch verbindbar sind, und weiters aus zumindest einem der Basisstation (BAS) zugeordneten Terminal (TE1, TE2). Die Basisstation (BAS) ist dazu eingerichtet, Steuersignale an Geräte (GE1 – GE3, BG1 – BG3) zu übermitteln, sowie Informationssignale von Geräten (GE1 – GE3, BG1 – BG3) zu empfangen, weiters ist die Basisstation (BAS) zur freien Konfigurierung von Szenarien eingerichtet, welche Schalt- und Steuervorgänge an beliebigen Geräten (GE1 – GE3, BG1 – BG3) betreffen. Szenarien sind durch Aktivierungssignale an die Basisstation (BAS) aktivierbar, wobei nach einer Aktivierung eines Szenarios die betreffenden Geräte (GE1 – GE3, BG1 – BG3) mittels Steuersignalen von der Basisstation (BAS) geschaltet und/oder gesteuert werden. Das Terminal (TE1, TE2) ist dazu eingerichtet, Aktivierungssignale an die Basisstation (BAS) zu senden, sowie Zustandssignale von der Basisstation (BAS) zu empfangen.

**LEDIGLICH ZUR INFORMATION**

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## VORRICHTUNG ZUM SCHALTEN, STEuern UND ÜBERWACHEN VON GERÄTEN

Die Erfindung betrifft eine Vorrichtung zum Schalten, Steuern und Überwachen von Geräten, insbesondere von Geräten in Wohn- oder Nutzbauten, bestehend aus einer Basisstation mit zumindest einem Prozessor und einem Speicher, welche ein oder mehrere Schnittstellen aufweist, über welche Geräte mit der Basisstation elektrisch verbindbar sind.

An die Elektroinstallationen in Gebäuden werden immer höhere Anforderungen gestellt. Reichte früher oft das einfache Ein- oder Ausschalten von Geräten, so wurden im Laufe der Zeit auch Funktionen zum Steuern und Melden sowie Energie- und Zeitmanagementfunktionen in den Aufgabenbereich der Elektroinstallationen aufgenommen.

An dieser Stelle soll erwähnt werden, daß unter Geräten, im speziellen Haushaltsgeräten, hier nicht nur herkömmliche Geräte wie Geschirrspüler, Herd, Fernseher etc. zu verstehen sind, sondern daß mit dem Begriff „Geräte“ im folgenden auch Alarmanlagen, Bewegungsmelder, Beleuchtungsanlagen, Heizungssteuerungen etc. bezeichnet werden. Weiters können die folgenden Überlegungen auch auf Bürogeräte wie Kopierer, Personal-Computer, Faxgeräte, Anrufbeantworter, etc. angewendet werden, wobei eine Unterscheidung zwischen Bürogeräten und Geräten, die in Wohngebäuden oder -räumen benutzt werden, zumeist weder eindeutig noch in Hinblick auf die Erfindung notwendig ist.

Für die verschiedenen Anwendungen, wie beispielsweise Jalousie-, Fenster- oder Heizungssteuerungen, wurden bisher zumeist einzelne, voneinander getrennte Systeme zur Steuerung und Überwachung installiert („Insellösungen“). Da hier jedes zu steuernde oder zu schaltende Gerät eine eigene Steuereinrichtung benötigt, ist dies mit einem hohen Verdrahtungsaufwand und einer Fülle von Leitungen verbunden. Zusätzlich erfordern Nutzungsänderungen von Gebäuden oder Räumen oftmals die Neuverdrahtung verschiedener Geräte, was naturgemäß mit einem hohen Arbeitsaufwand verbunden ist.

Wünschenswert ist, daß beispielsweise bei der Aktivierung einer Heizphase automatisch die Fenster in den beheizten Räumen geschlossen werden, um unnötige Energieverluste zu vermeiden. Das kann allerdings aufgrund der unabhängigen Steuerungen, wie oben beschrieben, nicht realisiert werden, da die Heizungs- und die Fenstersteuerung im allgemeinen nicht dazu eingerichtet sind, miteinander zu kommunizieren.

In den letzten Jahren konnten diese Nachteile zumindest teilweise dadurch behoben werden, daß vermehrt aus dem Industriebereich stammende Bussysteme in den Bereich der gerätesteu-

ernden Elektroinstallationen vordringen. Im Gegensatz zu den Insellösungen der herkömmlichen Elektroinstallation lassen sich die Geräte über eine gemeinsam genutzte Leitung, den sogenannten Bus, schalten, steuern und überwachen. Spezielle Beispiele sind der „Instabus“ sowie der „Europäische Installationsbus“ (EIB). Die an den Bus angeschlossenen Geräte sind hier über zwei Leitungen miteinander verbunden, über die sie zum einen untereinander Nachrichten austauschen können, und zum anderen die Spannungsversorgung beziehen.

Nachteilig an dieser Verwendung von Bussystemen ist, daß ein Nachrüsten von bestehenden Installationen zeit- und arbeitsintensiv sowie ohne einen Fachmann zumeist nicht möglich ist, falls nicht die Erweiterungsmöglichkeiten bereits in der ursprünglichen Planung des Systems berücksichtigt wurden.

Als besonders nachteilig erweist es sich, daß mit steigender Anzahl der zu steuernden Geräte, wobei die verschiedenen Schalt- und Steuervorgänge an verschiedenen Geräten oftmals zueinander in Abhängigkeit stehen, die Komplexität der Bedienung der Geräte stark steigt. Dies hat zur Folge, daß häufig die Bedienung der verschiedenen Geräte nur mehr mit hohem Aufwand zu bewältigen ist, was einer allgemeinen Akzeptanz und somit einer Verbreitung dieser Systeme entgegensteht.

Zusätzlich bedingt die Komplexität der Bedienung der Geräte oftmals auch noch einen „psychologischen“ Unsicherheitsfaktor, da ein Überwachen der Schalt- und Steuervorgänge mit zunehmender Anzahl der Geräte immer schwieriger wird. Das führt dazu, daß es für den Benutzer nur noch schwer zu übersehen ist, ob die Schalt- oder Steuervorgänge erfolgreich getätigt wurden, was häufig zu einer gewissen Verunsicherung führt.

Es ist eine Aufgabe der Erfindung, Geräte, insbesondere in Haushalten oder in Nutzbauten verwendete Geräte, zu einem Gesamtsystem zu integrieren, sodaß einerseits die Bedienung dieser Geräte für den Benutzer stark vereinfacht, und andererseits eine einfache und übersichtliche Überwachung der Geräte möglich wird.

Diese Aufgabe wird von einer eingangs erwähnten Vorrichtung dadurch gelöst, daß erfindungsgemäß

- die Basisstation dazu eingerichtet ist, Steuersignale an Geräte zu übermitteln sowie Informationssignale von Geräten zu empfangen,
- die Basisstation zur freien Konfigurierung von Szenarien eingerichtet ist, welche Schalt- und Steuervorgänge an beliebigen Geräten betreffen,

- Szenarien durch Aktivierungssignale an die Basisstation aktivierbar sind, wobei nach einer Aktivierung eines Szenarios die betreffenden Geräte mittels Steuersignalen von der Basisstation geschaltet und/oder gesteuert werden,
- und weiters der Basisstation zumindest ein Terminal zugeordnet ist, wobei das Terminal dazu eingerichtet ist, Aktivierungssignale an die Basisstation zu senden, sowie Zustandssignale von der Basisstation zu empfangen.

Die Erfindung schafft also eine Vorrichtung, welche eine einfache Bedienung von Geräten dadurch ermöglicht, daß in der Basisstation Szenarien frei programmierbar sind, diese Szenarien mittels Aktivierungssignalen an die Basisstation auslösbar sind, und die Basisstation mittels Steuersignalen die den Szenarien entsprechenden Steuer- und Schaltvorgänge an den Geräten auslöst. Durch ein Zusammenfassen häufig ablaufender, oftmals teilweise oder ganz voneinander abhängiger Steuer- und Schaltvorgänge zu Szenarien kann damit der Bedienungsaufwand von Geräten erheblich reduziert werden. Weiters ist der Basisstation zumindest ein Terminal zugeordnet, mit dessen Hilfe die Basisstation komfortabel hinsichtlich der Konfigurierung und Aktivierung der Szenarien sowie hinsichtlich der Überwachung der Geräte bedient werden kann.

Zweckmäßigerweise ist dabei das Terminal als von der Basisstation räumlich getrennte Einheit ausgebildet und mit der Basisstation über eine Schnittstelle verbindbar. Damit wird es möglich, sowohl die Basisstation als auch ein oder mehrere Terminals an den dafür am besten geeigneten Orten unterzubringen, ohne dahingehend Kompromisse eingehen zu müssen, wie dies bei der Ausbildung der Basisstation und des Terminals als ein Gerät notwendig ist.

Bei einer benutzerfreundlichen Ausführungsform der Erfindung weist das Terminal eine Anzeige auf, wobei es sich dabei vorteilhafterweise um eine berührungsempfindliche Anzeige handelt. Diese dient einerseits zur Zustandsanzeige der verschiedenen Geräte, andererseits kann die berührungsempfindliche Anzeige auch zur Eingabe von Befehlen und Daten zur Aktivierung bzw. Konfigurierung von Szenarien genutzt werden

Als besonders günstig erweist es sich weiters, wenn das Terminal sprachgesteuert ist. Damit wird die Bedienung der Basisstation hinsichtlich zumindest wesentlicher Funktionen durch Spracheingabe möglich.

Bei einer zweckmäßigen Ausführungsform der Erfindung ist vorgesehen, daß Aktivierungssignale für Szenarien mittels des Terminals auslösbar sind. Dabei wird ein an dem Terminal eingegebener Befehl in Form von Aktivierungssignalen an die Basisstation übermittelt, welche dann die jeweiligen Geräte entsprechend dem gewählten Szenario schaltet und/oder steuert.

Weiters kann es von Vorteil sein, wenn Aktivierungssignale für Szenarien automatisch, in Abhängigkeit von physikalischen Größen auslösbar sind. So kann beispielsweise bei einem Unterschreiten einer bestimmten, voreingestellten Temperatur in einem Raum ein Szenario aktiviert werden, bei welchem die Fenster geschlossen und die Heizung aktiviert wird.

Um eine Überwachung der Geräte zu ermöglichen, ist eine Übermittlung von Informationssignalen von geschalteten oder gesteuerten Geräten an die Basisstation entsprechend den jeweiligen Schalt- oder Steuervorgängen vorgesehen.

Dabei ist es zweckmäßig, wenn weiters eine Übermittlung von Zustandssignalen von der Basisstation an das Terminal entsprechend der Aktivierung von Szenarien vorgesehen ist. Die Aktivierung eines Szenarios, unabhängig davon, ob es automatisch oder von einem Terminal aus durch Eingabe eines Aktivierungsbefehles ausgelöst wurde, hat zur Folge, daß die Basisstation die entsprechenden Geräte mit Steuersignalen schaltet oder steuert. Nach diesen Schalt- und Steuervorgängen erfolgt eine Rückmeldung von den jeweiligen Geräten an die Steuereinrichtung über den Erfolg dieser Steuer- und Schaltvorgänge. Diese Information wird schließlich an das Terminal weitergeleitet, wo sie für den Benutzer über die Anzeige oder über Sprachausgabe zugänglich gemacht ist.

Bei einer zweckmäßigen Ausführungsform sind dabei die Geräte mittels Aktoren und Sensoren geschaltet, gesteuert und überwacht sind. Die Aktoren dienen hauptsächlich dazu, um die Steuersignale der Basisstation in entsprechende Schalt- oder Steuervorgänge an den zugeordneten Geräten umzusetzen, die Sensoren dienen im wesentlichen zur Überwachung des Zustandes der jeweiligen Geräte.

Weiters kann vorgesehen sein, daß die Basisstation über eine Schnittstelle mit einem Telekommunikationsnetz verbindbar ist und Aktivierungssignale für Szenarien über ein Telekommunikationsnetz auslösbar sind. Über diese Anbindung an ein Telekommunikationsnetz wird es ermöglicht, einzelne Geräte oder Szenarien auch von der Ferne zu aktivieren bzw. den Zustand der Geräte über das Telekommunikationsnetz abzufragen.

Besonders in Gebäuden, die über keine Anbindung an ein Festnetz verfügen, kann es dabei günstig sein, wenn das Telekommunikationsnetz ein Mobilfunknetz ist, um auch hier einen Zugriff auf Geräte von der Ferne zu ermöglichen.

Als günstig erweist es sich dabei, wenn die Basisstation über ein Telekommunikationsnetz mit einem Terminal verbindbar ist. Damit wird eine einfache Konfigurierung und Aktivierung von Szenarien sowie die Überwachung der Geräte auf einfache Weise auch aus der Ferne gewährleistet.

Dabei kann erweist es sich als besonders günstig sein, wenn ein Terminal zumindest hinsichtlich wesentlicher Funktionen durch ein Mobilfunkgerät emulierbar ist. Eine Aktivierung von Szenarien sowie die Überwachung des Zustandes der Geräte in einem Gebäude wird damit nahezu unabhängig vom momentanen Aufenthaltsort. Weiters bedingt die Verwendung eines Mobilfunkgerätes durch dessen Kompaktheit weitere Komfortgewinne, außerdem ist eine Information über besondere Ereignisse in einem zu überwachenden Gebäude beispielsweise über SMS („Short Message Service“) möglich.

Vorteilhaft ist es, wenn die Basisstation über eine der Schnittstellen mit einem gerätespezifischen Bus verbindbar ist. Eine bereits bestehende Businstallation, über welche verschiedene Geräte gesteuert werden, muß dann nicht zu Ungunsten der neuen, erfindungsgemäßen Vorrichtung entfernt werden, sondern kann problemlos in das neue System eingebunden werden.

Von besonderem Vorteil ist es schließlich, wenn eine oder mehrere Schnittstellen als Funkschnittstellen ausgebildet sind. Ein nachträgliches Hinzufügen von Geräten zu einem bereits bestehenden System wird dadurch auf einfache Weise möglich, da keine neuen Leitungen verlegt werden müssen. Es reicht dann aus, neu hinzugefügte Geräte mit einem entsprechenden Funkmodul, über welches die Anbindung der Geräte an die Funkschnittstelle(n) der Basisstation erfolgt, auszurüsten, sowie die verschiedenen Szenarien neu zu konfigurieren.

Im folgenden ist die Erfindung anhand der Zeichnung näher erläutert. In dieser zeigt die einzige Figur schematisch eine erfindungsgemäße Vorrichtung zum Schalten, Steuern und Überwachen von Geräten.

Wie man aus der Figur erkennen kann, besitzt die Vorrichtung eine Basisstation BAS, wobei die Basisstation BAS zumindest einen Prozessor und einen Speicher aufweist. Diese Basisstation BAS verfügt in der skizzierten Ausführungsform über mehrere Schnittstellen SC1 - SC4, wobei einige dieser Schnittstellen als Funkschnittstellen SC1, SC2, ausgebildet sind. Über eine dieser Schnittstellen SC2, welche dazu in der Regel als Multiplex-Schnittstelle ausgebildet ist, steht die Basisstation BAS mit verschiedenen Geräten GE1 - GE3 in Verbindung. In der Zeichnung sind nur drei Geräte dargestellt, bei einer praxisnahen Ausführung handelt es sich aber zumeist um eine wesentlich größere Anzahl von angeschlossenen Geräten. So sind beispielsweise an die Basisstation BAS Küchengeräte wie Elektroherd, Geschirrspüler, Mikrowelle, Kühlschrank, etc. angeschlossen, weiters können auch noch andere Geräte wie Fernseher, Stereoanlage usw. angeschlossen sein. Neben diesen Geräten im herkömmlichen Sinn sind aber auch noch Beleuchtungsanlagen, Alarmanlagen, Heizung, Bewegungsmelder, Jalousie- und Fenstersteuerung usw. an die Basisstation anschließbar.

Die zu der Vorrichtung gehörenden Geräte GE1 - GE3 weisen zur Anbindung an die Basisstation BAS in der Regel ein Modul MO1 - MO3 bestehend jeweils aus einer Funkschnittstelle, einem Aktor sowie einem Sensor auf. Über die Funkschnittstelle SC2 sowie die Funkschnittstelle des Moduls MO1 - MO3 erfolgt die Kommunikation zwischen dem jeweiligen Gerät GE1 - GE3 und der Basisstation BAS, die Aktoren dienen dazu, Steuersignale von der Basisstation BAS in Steuer- oder Schaltvorgänge an dem jeweiligen Gerät GE1 - GE3 umzusetzen. Die Sensoren sind schließlich dazu vorgesehen, die Basisstation BAS über den jeweiligen Zustand des zugehörigen Gerätes GE1 - GE3, z. B. über die Temperatur einer Herdplatte, zu informieren.

Mittels der Module MO1 - MO3 wird eine Erweiterung der Vorrichtung auf einfache Weise möglich, da Geräte, die an die Basisstation BAS angebunden werden sollen, einfach mit diesen Modulen erweitert werden müssen. Für die nähere Zukunft ist eine Normung dieser Module geplant. Eine Verkabelung der neuen Geräte mit der Basisstation BAS kann entfallen.

Über eine weitere Schnittstelle SC1 steht die Basisstation BAS mit einem Terminal TE1 in Verbindung, wobei das Terminal TE1 ebenfalls eine Funkschnittstelle TES aufweist. Voraussetzend sei hier erwähnt, daß prinzipiell die Schnittstellen SC1 und SC2 auch als Drahtschnittstellen ausgebildet sein können, hinsichtlich der Modularität und Erweiterbarkeit des gesamten Systems aber die Verwendung von Funkschnittstellen vorzuziehen ist. Weiters ist es auch realisierbar, daß sowohl ein oder mehrere Terminals als auch verschiedene Geräte über nur eine Multiplex-Funkschnittstelle mit der Basisstation verbindbar sind.

Das Terminal TE1 weist zumindest eine Anzeige auf. Weiters ist zur Eingabe von Befehlen, Daten etc. eine Tastatur und/oder eine berührungsempfindliche Anzeige vorgesehen. Außerdem ist noch vorgesehen, daß das Terminal TE1 Lautsprecher, Mikrofon sowie die notwendigen, dem Fachmann bekannten elektronischen Einrichtungen aufweist, damit eine Spracheingabe sowie -ausgabe von Befehlen bzw. Informationen über das Terminal TE1 möglich ist.

Die Basisstation BAS ist zur freien Konfigurierung von Szenarien betreffend Schalt- und Steuervorgängen an den Geräten GE1 - GE3 eingerichtet. Die zur Konfigurierung notwendigen Eingaben von Daten und Befehlen erfolgen dabei zweckmäßigerweise über das Terminal TE1. Unterstützt wird die benutzerseitige Konfigurierung von Szenarien durch geeignete Software, die bei der Konfigurierung von zweifelhaften Szenarien zumindest eine Warnung ausgibt. Weiters können Szenarien auch bereits werkseitig definiert sein, oder es kann eine Konfigurierung von gewünschten Szenarien über ein Telekommunikationsnetz - siehe dazu die Beschreibung weiter unten - erfolgen.



Einmal konfigurierte Szenarien können durch Eingabe eines entsprechenden Befehles ausgelöst werden. In der Regel wird dabei der jeweilige Befehl über das Terminal TE1, z. B. durch Spracheingabe, aktiviert. Das Terminal TE1 sendet an die Basisstation BAS das entsprechende Aktivierungssignal, und von der Basisstation BAS werden die dem jeweiligen Szenario zugeordneten Geräte GE1 - GE3 über die Funkschnittstelle SC2 angesprochen. Die Aktoren der Geräte GE1 - GE3 setzen die Steuersignale der Basisstation BAS in entsprechende Schalt- und Steuervorgänge der Geräte GE1 - GE3 um.

Es kann auch vorgesehen sein, daß Szenarien automatisch ausgelöst werden, z. B. in Abhängigkeit von physikalischen Größen. So ist es denkbar, daß bei einem Unterschreiten einer voreingestellten, definierten Raumtemperatur ein Szenario aktiviert wird, in dessen Rahmen die Fenster geschlossen und die Heizung eingeschaltet werden. Szenarien können aber auch automatisch durch gewisse Ereignisse ausgelöst werden. So könnte über Bewegungsmelder und andere Sensoren beispielsweise festgestellt werden, daß sich in einer Wohnung keine Personen mehr aufhalten. Dies wird von den Sensoren an die Basisstation BAS gemeldet, wodurch ein Szenario ausgelöst wird, welches so konfiguriert ist, daß die gesamte Beleuchtung abschaltet wird, eingehende Anrufe auf einen Anrufbeantworter geleitet werden, die Raumtemperatur abgesenkt wird usw.

Die Deaktivierung von Szenarien ist ebenfalls durch Befehlseingabe oder automatisch möglich, ein Szenario kann auch von einem nachfolgenden Szenario abgelöst werden. Natürlich kann ein Szenario einfach dadurch beendet werden, daß alle Geräte wieder in ihren Ausgangszustand, der vor der Aktivierung des Szenarios herrschte, zurückkehren.

In jedem Falle werden von den gesteuerten oder geschalteten Geräten GE1 - GE3 Informationssignale an die Basisstation BAS hinsichtlich der Schalt- und Steuervorgänge übermittelt. So kann gemeinsam mit dem Terminal TE1 der Benutzer über die ablaufenden Szenarien bzw. über den Status der einzelnen Geräte GE1 - GE3 informiert werden. Als zweckmäßig erweist es sich dabei, daß für den Fall, daß ein Schalt- oder Steuervorgang nicht ausgeführt werden konnte, eine separate Information an den Benutzer, beispielsweise über eine Sprachausgabe des Terminal TE1 erfolgt. Falls gewünscht, kann natürlich auch eine positive Aktivierung einzelner Szenarien mittels Sprachausgabe noch zusätzlich bestätigt werden.

Wie man weiters aus der Figur erkennen kann, ist die Basisstation BAS über eine Schnittstelle SC3 auch noch mit anderen Vorrichtungen zur Steuerung von Geräten verbindbar. Hier ist die Basisstation BAS mit einem gerätespezifischen Bus BUS, z. B. einem EI-Bus („Europäischer Installations-Bus“) verbunden, welcher verschiedenen Geräte BG1 - BG3 steuert. Mittels dieser Anbindungsmöglichkeit wird eine Einbindung von bereits bestehenden Systemen zur Gerätesteuerung problemlos möglich, und die Geräte BG1 - BG3 können ohne besonderen

Aufwand in die Szenariengestaltung miteinbezogen werden. Entsprechend der Darstellung in der Figur erfolgt dabei die Anbindung des gerätespezifischen Busses BUS an die Basisstation BAS über eine Drahtschnittstelle, eine solche Verbindung kann zweckmäßigerweise aber auch über Funkschnittstellen hergestellt werden.

Schließlich ist die Basisstation BAS über eine Schnittstelle SC4 an ein Telekommunikationsnetz NET anbindbar. In der Regel handelt es sich dabei um ein Festnetz, die Anbindung erfolgt dabei über ein zweckmäßigerweise in die Basisstation BAS integriertes Modem. Die Bedienung der Geräte sowie deren Überwachung aus der Ferne kann dann durch Sprachein- und -ausgabe über ein herkömmliches Festnetztelefon TEL erfolgen. Benutzerfreundlicher ist es allerdings, wenn die Basisstation BAS über das Telekommunikationsnetz NET an ein Terminal TE2 angeschlossen ist. Hierzu erweist es sich als zweckmäßig, wenn ein portables Terminal TE2 vorgesehen ist. Über ein Telekommunikationsnetz kann die Basisstation BAS aber auch mit sogenannten Diensteanbietern in Verbindung stehen. Ein solcher Diensteanbieter kann z. B. ein Energieversorgungsunternehmen sein, welches die Basisstation BAS über einen günstigen Stromtarif informiert. Mittels dieser Information wird ein dementsprechendes Szenario, bei dem beispielsweise besonders energieintensive Geräte, wie Geschirrspüler oder Waschmaschine eingeschaltet werden, aktiviert.

Zusätzlich kann die Basisstation BAS über ein Telekommunikationsnetz mit einem Wachdienst oder der Polizei verbunden sein. Eine Alarmierung dieser Stellen bei unvorhergesehenen, beispielsweise von Bewegungsmeldern festgestellten Ereignisse kann dann von der Basisstation BAS über das Telekommunikationsnetz in die Wege geleitet werden.

Von besonderem Vorteil ist die Anbindungsmöglichkeit der Basisstation BAS über ein Telekommunikationsnetz NET an ein Mobilfunkgerät MOT, beispielsweise an ein GSM-Mobiltelefon („Global System for Mobile-Communication“). Durch diese Anbindungsmöglichkeit wird die Steuerung und Überwachung von Geräten, die mit der Basisstation BAS in Verbindung stehen, über Sprachein- und -ausgabe von nahezu jedem Ort aus möglich, ohne daß eine zusätzliche Mitnahme eines Terminals notwendig ist. Mit zeitgemäßen Mobiltelefonen, die beispielsweise den WAP-Standard („Wireless Application Protocol“) unterstützen, kann ein Terminal in der Regel hinsichtlich aller seiner Funktionen emuliert werden. Dadurch wird der Bedienkomfort gegenüber der Verwendung eines Festnetztelefonies stark gesteigert. Weiters kann bei unerwarteten Ereignissen oder Szenarien, die in Abwesenheit des oder der Wohnungs- oder Hausbenutzer erfolgen, eine Meldung an das Mobilfunkgerät MOT abgesetzt werden. Dies kann beispielsweise in Form einer SMS-Nachricht („Short Message Service“), einer e-mail oder durch eine Sprachmitteilung erfolgen.

Die Anbindung eines Mobilfunkgerätes an die Basisstation BAS kann dabei über ein Festnetz erfolgen, aber auch über ein Mobilfunknetz. Zum diesem Zweck kann die Basisstation BAS beispielsweise mit einem GSM-Modul ausgerüstet werden. Die Anbindungsmöglichkeit an ein Mobilfunknetz ist besonders dann von Bedeutung, wenn die zu steuernden und überwachenden Geräte sich in einem Gebäude ohne Festnetzanschluß befinden.

Weiters ist auch noch eine Einbindung der Basisstation BAS in eine DECT-Umgebung („Digital European standard for Cordless Telephones“) denkbar, wodurch eine Bedienung von Geräten durch auf dem DECT-Standard basierende Mobilfunkgeräte möglich wird.

Wie in den voranstehenden Absätzen erläutert, weist die erfindungsgemäße Vorrichtung zur Schaltung, Steuerung und Überwachung von Geräten eine Vielzahl von Vorteilen auf. So wird durch die Möglichkeit zur Szenarienkonfigurierung die Bedienung von Geräten stark erleichtert. Häufig gebrauchte, regelmäßig auftretende Schalt- und Steuervorgänge, die oftmals zueinander in Abhängigkeit stehen, können so durch einen einzelnen Befehl aktiviert werden. Durch die automatische Aktivierung von Szenarien durch physikalische Größen oder durch das Eintreten bestimmter, vordefinierter Ereignisse kann der Bedienaufwand zusätzlich noch reduziert werden. Oftmals ist man sich beim Verlassen der Wohnung nach einiger Zeit nicht mehr sicher, ob man den Herd oder das Bügeleisen abgeschaltet hat. Durch automatisches Aktivieren eines entsprechenden Szenarios, welches beim Verlassen der Wohnung alle elektrischen Geräte abschaltet, kann das subjektive Sicherheitsgefühl in dieser Hinsicht stark erhöht werden.

Ein weiteres Beispiel zur Erhöhung des Sicherheitsempfindens ist ein Szenario zur Anwesenheitssimulation, welches beispielsweise bei Abwesenheit, etwa während des Urlaubs, aktiviert wird. In diesem Szenario werden verschiedene Geräte, wie Beleuchtungsanlage, Fernsehgerät, HiFi-Anlage, etc. so von der Basisstation gesteuert, daß dadurch die Anwesenheit von Personen vorgetäuscht wird. Ein solches Szenario kann sich bei der Abschreckung von Einbrechern als zweckmäßig erweisen.

Weiters kann man über ein Telekommunikationsnetz auf sein Ferienhaus zugreifen. Hier wäre ein „Willkommens“-Szenario denkbar, welches eine bestimmte Zeit vor dem geplanten Eintreffen zur Frischluftzufuhr im Ferienhaus die Fenster öffnet, und anschließend, nach dem Schließen der Fenster die Heizung anschaltet, damit sich beim Eintreffen die Raumtemperatur bereits auf einem angenehmen Wert befindet.

Auf eine detailliertere Beschreibung von Szenarien soll hier nicht weiter eingegangen werden, da die Möglichkeiten mannigfaltig sind und stark vom Benutzer abhängen.

Informationen betreffend den Zustand der einzelnen Geräte können ständig am Terminal oder einem das Terminal emulierenden Mobilfunkgerät abgelesen werden. Meldungen über nicht getätigte Schalt- oder Steuervorgänge können auf unterschiedlichste Weisen ausgegeben werden. Dadurch wird eine übersichtliche Überwachung der einzelnen Geräte ermöglicht.

Die Vorrichtung zeichnet sich weiters durch ihren modularen Aufbau aus, welcher den Zukauf von neuen Geräten sowie deren Aufnahme in die Szenariengestaltung stark erleichtert. Bei Bedarf können Terminals in mehreren Räumen installiert werden, außerdem ist es aufgrund der Funkschnittstellen auch möglich, portable Terminals zu verwenden.

Eine bereits existierende Installation einer Vorrichtung zum Bedienen von Geräten, wie etwa eines gerätespezifischen Busses, muß nicht rückgängig gemacht werden, falls man die erfindungsgemäße Vorrichtung zum Einsatz bringen möchte, da eine Anbindung des Busses an die Basisstation möglich ist. Der Bus mit den zugehörigen Busgeräten kann dann über die Basisstation gesteuert werden.

Die vorliegende erfindungsgemäße Vorrichtung schafft zusammenfassend durch ihren modularen Aufbau ein die Inzellösungen der herkömmlichen Elektroinstallation integrierendes Gesamtsystem zur Schaltung, Steuerung und Überwachung von Geräten. Mittels dieser Vorrichtung kann durch die im wesentlichen freie Konfigurierung von Szenarien die Komplexität der Bedienung von Geräten stark reduziert werden, wodurch ein Einsatz dieses Systems für nahezu alle Haushalte, Büros etc. sowie für nahezu alle Personengruppen denkbar wird.

## PATENTANSPRÜCHE

1. Vorrichtung zum Schalten, Steuern und Überwachen von Geräten, insbesondere von Geräten in Wohn- oder Nutzbauten, bestehend aus einer Basisstation (BAS) mit zumindest einem Prozessor und einem Speicher, welche ein oder mehrere Schnittstellen (SC1 - SC4) aufweist, über welche Geräte (GE1 - GE3, BG1 - BG3) mit der Basisstation (BAS) elektrisch verbindbar sind,

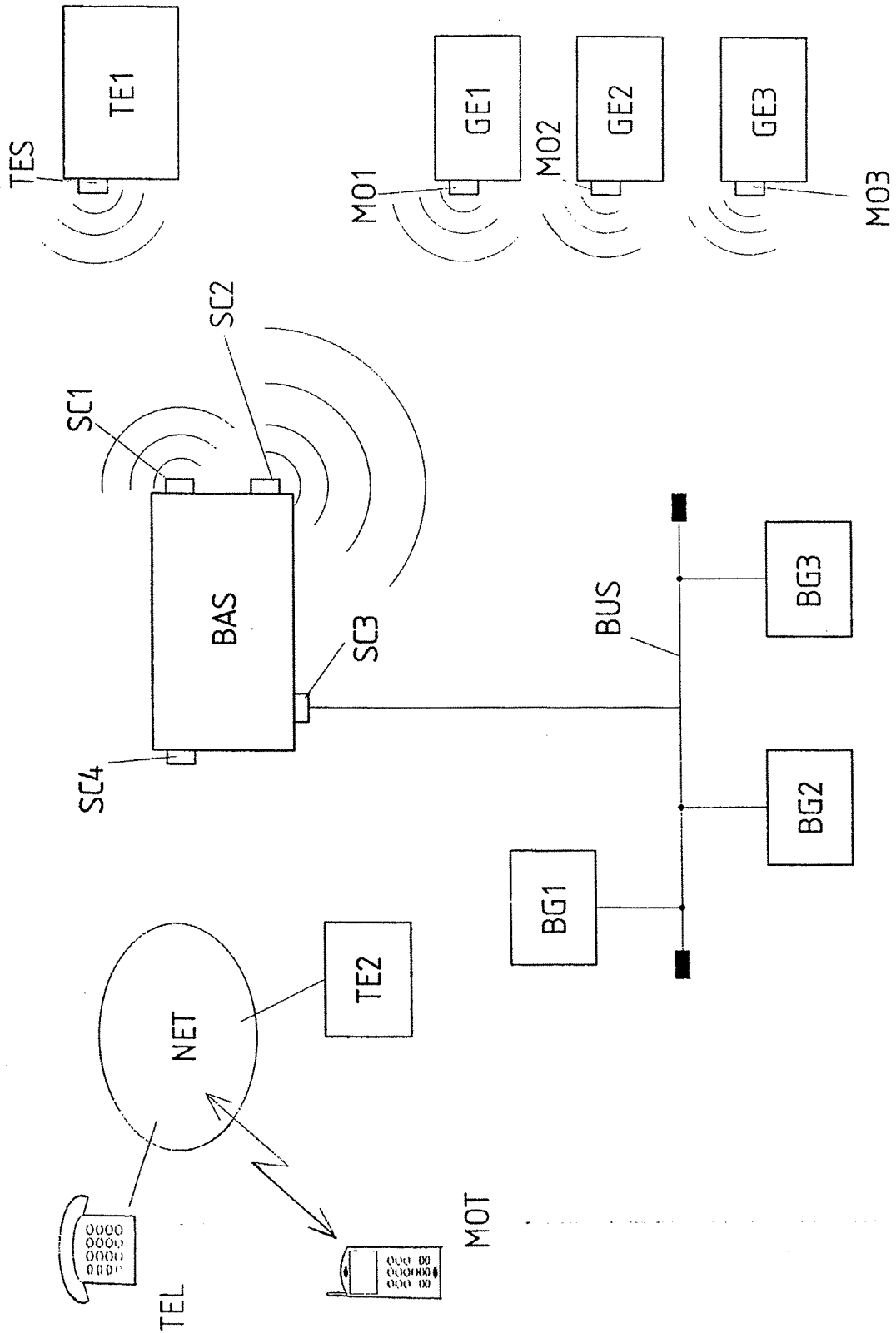
**dadurch gekennzeichnet, daß**

- die Basisstation (BAS) dazu eingerichtet ist, Steuersignale an Geräte (GE1 - GE3, BG1 - BG3) zu übermitteln sowie Informationssignale von Geräten (GE1 - GE3, BG1 - BG3) zu empfangen,
  - die Basisstation (BAS) zur freien Konfigurierung von Szenarien eingerichtet ist, welche Schalt- und Steuervorgänge an beliebigen Geräten (GE1 - GE3, BG1 - BG3) betreffen,
  - Szenarien durch Aktivierungssignale an die Basisstation (BAS) aktivierbar sind, wobei nach einer Aktivierung eines Szenarios die betreffenden Geräte (GE1 - GE3, BG1 - BG3) mittels Steuersignalen von der Basisstation (BAS) geschaltet und/oder gesteuert werden,
  - und weiters der Basisstation (BAS) zumindest ein Terminal (TE1, TE2) zugeordnet ist, wobei das Terminal (TE1, TE2) dazu eingerichtet ist, Aktivierungssignale an die Basisstation (BAS) zu senden, sowie Zustandssignale von der Basisstation (BAS) zu empfangen.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das Terminal (TE1) als von der Basisstation (BAS) räumlich getrennte Einheit ausgebildet und mit der Basisstation (BAS) über eine Schnittstelle (SC1) verbindbar ist.
  3. Vorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** das Terminal (TE1, TE2) eine Anzeige aufweist.
  4. Vorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, daß** das Terminal (TE1, TE2) eine berührungsempfindliche Anzeige aufweist.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, daß** das Terminal (TE1, TE2) sprachgesteuert ist.
6. Vorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, daß** Aktivierungssignale für Szenarien mittels des Terminals (TE1, TE2) auslösbar sind.
7. Vorrichtung nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, daß** Aktivierungssignale für Szenarien automatisch, in Abhängigkeit von physikalischen Größen auslösbar sind.
8. Vorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, daß** eine Übermittlung von Informationssignalen von geschalteten oder gesteuerten Geräten (GE1 - GE3, BG1 - BG3) an die Basisstation (BAS) entsprechend den jeweiligen Schalt- oder Steuervorgängen vorgesehen ist.
9. Vorrichtung nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, daß** eine Übermittlung von Zustandssignalen von der Basisstation (BAS) an das Terminal (TE1, TE2) entsprechend der Aktivierung von Szenarien vorgesehen ist.
10. Vorrichtung nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** die Geräte (GE1 - GE3, BG1 - BG3) mittels Aktoren und Sensoren geschaltet, gesteuert und überwacht sind.
11. Vorrichtung nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, daß** die Basisstation (BAS) über eine Schnittstelle (SC4) mit einem Telekommunikationsnetz (NET) verbindbar ist und Aktivierungssignale für Szenarien über ein Telekommunikationsnetz (NET) auslösbar sind.
12. Vorrichtung nach Anspruch 11, **dadurch gekennzeichnet, daß** das Telekommunikationsnetz (NET) ein Mobilfunknetz ist.
13. Vorrichtung nach Anspruch 11 oder 12, **dadurch gekennzeichnet, daß** die Basisstation (BAS) über ein Telekommunikationsnetz (NET) mit einem Terminal (TE2) verbindbar ist.
14. Vorrichtung nach einem der Ansprüche 11 bis 13, **dadurch gekennzeichnet, daß** ein Terminal zumindest hinsichtlich wesentlicher Funktionen durch ein Mobilfunkgerät (MOT) emulierbar ist.

15. Vorrichtung nach einem der Ansprüche 1 bis 14, **dadurch gekennzeichnet, daß** die Basisstation (BAS) über eine Schnittstellen (SC3) mit einem gerätespezifischen Bus (BUS) verbindbar ist.
  
16. Vorrichtung nach einem der Ansprüche 1 bis 15, **dadurch gekennzeichnet, daß** eine oder mehrere Schnittstellen (SC1 - SC4) als Funkschnittstellen ausgebildet sind.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/AT 99/00301

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 H04L12/28 H04M11/00				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) IPC 7 H04L H04M				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	DE 43 21 304 A (DOMARKAS BRIGITTE) 2 March 1995 (1995-03-02) the whole document ----	1-16		
X	EP 0 825 740 A (BOSCH SIEMENS HAUSGERAETE) 25 February 1998 (1998-02-25) column 2, line 33 -column 4, line 16 column 6, line 41 - line 54 abstract; claims 1-5,7,9,15,17; figures 1,7 ----	1-4,6		
X	WO 98 00788 A (SUN MICROSYSTEMS INC) 8 January 1998 (1998-01-08) page 1, paragraph 2 -page 3, paragraph 1 page 5, paragraph 2 -page 8, paragraph 2 page 11, paragraph 4 -page 13, paragraph 5 abstract; claims 1,4-6; figures 1,3,6,7 ---- -/--	1,3,6-8		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
<input checked="" type="checkbox"/> Patent family members are listed in annex.				
* Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     *A* document defining the general state of the art which is not considered to be of particular relevance                      *E* earlier document but published on or after the international filing date                      *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      *O* document referring to an oral disclosure, use, exhibition or other means                      *P* document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.                      *&amp;* document member of the same patent family                 </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family			
Date of the actual completion of the international search <p style="text-align: center; font-size: 1.2em;">21 June 2000</p>		Date of mailing of the international search report <p style="text-align: center; font-size: 1.2em;">05/07/2000</p>		
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer <p style="text-align: center; font-size: 1.2em;">Kalabic, F</p>		

1

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/AT 99/00301

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 201 067 A (PARMELEE STEVEN G ET AL) 6 April 1993 (1993-04-06) column 4, line 38 -column 5, line 46 figures 3,4 ---	1-3,6, 12-14,16
A	DE 196 40 483 A (AFG ELEKTRONIK GMBH ;AUER GOTTFRIED (DE)) 16 April 1998 (1998-04-16) column 1, line 15 -column 3, line 59 column 7, line 12 -column 9, line 23 claims 1,2,5; figures 1,2 ---	1-16
A	EP 0 859 501 A (DIEHL STIFTUNG & CO) 19 August 1998 (1998-08-19) the whole document -----	1-16

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# INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen

PCT/AT 99/00301

**A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES**  
 IPK 7 H04L12/28 H04M11/00

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

**B. RECHERCHIERTE GEBIETE**

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)  
 IPK 7 H04L H04M

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

EPO-Internal, WPI Data, PAJ

**C. ALS WESENTLICH ANGESEHENE UNTERLAGEN**

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
X	DE 43 21 304 A (DOMARKAS BRIGITTE) 2. März 1995 (1995-03-02) das ganze Dokument ---	1-16
X	EP 0 825 740 A (BOSCH SIEMENS HAUSGERAETE) 25. Februar 1998 (1998-02-25) Spalte 2, Zeile 33 - Spalte 4, Zeile 16 Spalte 6, Zeile 41 - Zeile 54 Zusammenfassung; Ansprüche 1-5,7,9,15,17; Abbildungen 1,7 ---	1-4,6
X	WO 98 00788 A (SUN MICROSYSTEMS INC) 8. Januar 1998 (1998-01-08) Seite 1, Absatz 2 - Seite 3, Absatz 1 Seite 5, Absatz 2 - Seite 8, Absatz 2 Seite 11, Absatz 4 - Seite 13, Absatz 5 Zusammenfassung; Ansprüche 1,4-6; Abbildungen 1,3,6,7 --- -/--	1,3,6-8

Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

Siehe Anhang Patentfamilie

\* Besondere Kategorien von angegebenen Veröffentlichungen :

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Datum des Abschlusses der internationalen Recherche

21. Juni 2000

Absenddatum des internationalen Recherchenberichts

05/07/2000

Name und Postanschrift der Internationalen Recherchenbehörde  
 Europäisches Patentamt, P.B. 5818 Patentaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Bevollmächtigter Bediensteter

Kalabic, F

**INTERNATIONALER RECHERCHENBERICHT**

Internationales Aktenzeichen  
PCT/AT 99/00301

C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN		
Kategorie°	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	US 5 201 067 A (PARMELEE STEVEN G ET AL) 6. April 1993 (1993-04-06) Spalte 4, Zeile 38 -Spalte 5, Zeile 46 Abbildungen 3,4 ----	1-3,6, 12-14,16
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A	EP 0 859 501 A (DIEHL STIFTUNG & CO) 19. August 1998 (1998-08-19) das ganze Dokument -----	1-16

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Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen

PCT/AT 99/00301

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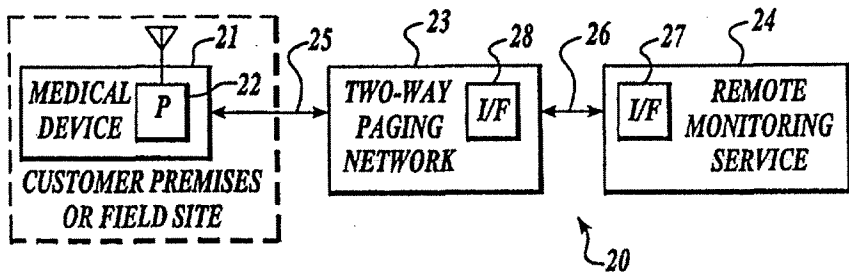


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(54) Title: METHOD AND APPARATUS FOR REMOTE WIRELESS COMMUNICATION WITH A MEDICAL DEVICE



(57) Abstract

A medical device is configured to support two-way pager communication to remotely monitor the status and configuration of the medical device. A two-way pager module is incorporated into the medical device. A remote monitoring service is configured to regularly communicate with the medical device to initiate self-tests, obtain status information or provide reconfiguration information and software updates. The medical device then sends a return message to the remote monitoring service using the two-way paging network. The return message would include the requested information, self-test results, or acknowledgement that the reconfiguration or software update was performed. The system can be expanded so that the remote monitoring service can monitor a large number of medical devices. This system can be advantageously used to efficiently monitor a large number of portable or mobile medical devices at a low cost and in a manner that is transparent to the users of the medical devices. In addition, no extra infrastructure needs to be added to implement the system. In a further refinement, the medical devices may include a GPS module so that the location of the medical devices may be monitored.

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## METHOD AND APPARATUS FOR REMOTE WIRELESS COMMUNICATION WITH A MEDICAL DEVICE

### Field of the Invention

The present invention is related to communication systems for use with a  
5 medical device and, more particularly, to remote wireless communication systems  
for medical devices using a two-way paging system.

### Background Information

Many medical devices such as, for example, defibrillators are monitored for  
status and condition. One conventional method to monitor the medical devices  
10 includes having a technician manually check and test the medical devices on a  
regular basis. These devices generally are kept at the customer's site and, because  
these devices tend to be complex, the customers or users are generally not trained to  
perform this monitoring process. Consequently, some of these devices are  
configured to communicate with an off-site monitoring service, which can remotely  
15 obtain the status and condition information. In addition, the monitoring service can  
remotely initiate self-tests and reconfiguration. These conventional systems tend to  
use either wired connections (e.g., LAN or telephone service) or wireless systems  
such as cellular telephone or specialized proprietary RF systems.

FIGURE 1 is a block diagram illustrative of a conventional medical device  
20 communication system 10 having a medical device 11, a communication network 12,  
and a remote monitoring service 13. As indicated by the dashed lines in FIGURE 1,  
the medical device 11 can be located at the user's premises or at a field site (e.g.,

when paramedics in responding to an emergency use a portable external defibrillator). The communication network 12 may be a wired system such as, for example, a normal telephone system 15 or a local area network (LAN) 16. Alternatively, the communication network 12 may be a wireless system such as, for example, a cellular telephone system 17 or a private wireless communication system 18 dedicated to monitoring medical devices. Some of these conventional wireless systems require that a vehicle with receiving equipment drive by the customer's premises in order to communicate with the medical device 11. The medical device 11 includes an interface 19 for communicating with the remote monitoring service 13 through the communication system 12.

The remote monitoring service 13 is configured to obtain status information from the medical device 11. For example, in a system adapted for monitoring a portable external defibrillator, the remote monitoring service 13 may be configured to obtain information such as battery charge, battery age, self-test results, configuration parameters, internal state (e.g., off, on, or charging), or even physiological data measured from a patient during treatment. The remote monitoring service 13 may also initiate self-tests or reconfigure the medical device 11.

These conventional systems have drawbacks such as having to be physically connected to a telephone line in the case of wired systems or having added special infrastructure that is relatively expensive to obtain and operate in the case of wireless systems. With the market for some medical devices expanding into households, there is a need for low cost, wireless remote communication system for medical devices.

#### Summary

In accordance with the present invention, a medical device is configured to support two-way pager communication is provided. In one aspect of the invention, a two-way pager module supporting digital communication is incorporated into the medical device. The two-way pager module allows a remote monitoring service to regularly communicate with the medical device to initiate self-tests, obtain status information and provide reconfiguration information. The two-way pager modules are commercially available and relatively inexpensive to purchase and operate. No additional infrastructure is needed (i.e., the paging service provider has the infrastructure). Also, the system is self-contained in the medical device and the operation is transparent to the user. The system can also be used with portable medical devices without connecting and reconnecting the portable medical device to

the communication network (i.e., as long as the medical device is within the service area of the paging service). Accordingly, using a two-way paging communication system advantageously avoids the physical constraints of wired systems at a lower cost than relatively expensive cellular and private wireless system. Further, using a two-way paging system avoids the need to provide a communication infrastructure or to use "drive-by" techniques as is required in some conventional private wireless systems.

In a further aspect of the present invention, the remote monitoring service is configured to initiate pages addressed to the desired medical device that include, for example, instructions (or codes representing instructions) for the medical device to provide status, perform self-tests or change the medical device's configuration. In one embodiment, the monitoring service initiates such pages by calling the "pager" number previously assigned to the desired medical device, using a telephone/modem connection. In one embodiment, the instructions are added to the page by providing a number or code representing the desired instruction. The paging service then generates a page with the desired instruction, addressed to the desired medical device. The medical device receives the page and then extracts and performs the instructions. The medical device may be instructed to transmit a message back to the paging service containing self-test results, status data or condition data using the two-way pager module.

In a preferred portable AED (automatic external defibrillator) embodiment, the two-way pager module includes a transmitter, receiver, antenna and signal processing circuitry. The medical device has a control unit with a processor that is programmed to operate the two-way pager module to receive pages containing digital data and to transmit return messages to the paging service (i.e., the paging switch). Because an AED typically includes a processor, in a further aspect of the present invention, the control task for the two-way pager module is simply added to AED's existing software.

In a further refinement of the present invention, the medical device may include a GPS module so that the location of the medical device may be monitored.

#### Brief Description of the Drawings

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated by reference to the following detailed description, when taken in conjunction with the accompanying drawings listed below.

FIGURE 1 is a block diagram illustrative of some conventional communication systems for medical devices.

FIGURE 2 is a block diagram illustrative of a remote wireless communication system for use with medical devices, according to one embodiment  
5 of the present invention.

FIGURE 3 is a flow diagram illustrative of the operation of the remote wireless communication system of FIGURE 2, according to one embodiment of the present invention.

FIGURE 4 is a block diagram illustrative of a defibrillator implementing the medical device in FIGURE 2, according to one embodiment of the present invention.  
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FIGURE 5 is a block diagram illustrative of the remote monitoring unit in FIGURE 2, according to one embodiment of the present invention.

FIGURE 6 is a flow diagram illustrative of the operation of the remote wireless communication system of FIGURE 2, according to another embodiment of  
15 the present invention.

FIGURE 7 is a block diagram illustrative of a medical device configured to provide information regarding the location of the medical device to a remote monitoring service, according to one embodiment of the present invention.

FIGURE 8 is a block diagram illustrative of a remote wireless and data network communication system for use with medical devices, according to one  
20 embodiment of the present invention.

FIGURES 9A and 9B are block diagrams illustrative of two embodiments of data network communication links between the remote monitoring service and the two-way paging network depicted in FIGURE 8, according to the present invention.

FIGURE 10 is a block diagram illustrative of a remote wireless communication system for use with medical devices, according to another  
25 embodiment of the present invention.

FIGURE 11 is a block diagram illustrative of a remote wireless communication system for use with smart subsystems of medical devices, according  
30 to one embodiment of the present invention.

#### Detailed Description

FIGURE 2 is a simplified diagram illustrative of a remote wireless communication system 20 for use with medical devices, according to one  
embodiment of the present invention. Communication system 20 includes a medical  
35 device 21 with a two-way pager module 22, a two-way paging network 23 and a

remote monitoring service 24. Although only one medical device is shown in FIGURE 2, it will be appreciated that the remote monitoring service 24 can monitor a relatively large number of medical devices (not shown) using the two-way paging network 23 of the communication system 20. The medical device 22 communicates with the remote monitoring service 24 through the two-way paging system 23. The two-way paging module 23 is a standard commercially available two-way paging module. In particular, the medical device 21 uses the two-way paging module 22 to interface with the paging system 23 through a wireless channel, indicated by an arrow 25. In addition, the two-way paging network 23 communicates with the remote monitoring service 24 through a channel (wired or wireless), indicated by an arrow 26. In one embodiment, the channel 26 is a standard telephone connection with standard modem interfaces 27 and 28 in remote monitoring service 24 and two-way paging network 23, respectively. As will be appreciated by those skilled in the art in light of this disclosure, the channel 26 need not be a standard telephone connection in other embodiments.

FIGURE 3 is a flow diagram illustrative of the operation of the remote wireless communication system 20 (FIGURE 2), according to one embodiment of the present invention. Referring to FIGS. 2 and 3, remote wireless communication system 20 operates as follows. In a block 31, the remote monitoring service 24 initiates a page addressed to the desired medical device (i.e., the medical device 12 in this example). The page includes, for example, instructions (or codes representing instructions) for the medical device 21 to provide status, perform self-tests or change the configuration (e.g., update the software) of the medical device 21. The remote monitoring service 24 initiates the page by sending a page request to the two-way paging network 23 with the desired page address and data. In general, any wired or wireless data transmission network may be used to initiate the page. In one embodiment, the monitoring service 24 initiates this page by calling a "pager" number previously assigned to the medical device 21, using a standard telephone line and modem connection. In other embodiments, other types of communication links can be used between the remote monitoring service 24 and the two-way paging network 23. The remote monitoring service 24 encodes instructions to be transferred by the paging system. Further, error correction techniques are often used to ensure correct reception of the encoded instructions in the presence of noise in the transmission channel. The two-way paging network 23 includes a paging switch (not

shown) that generates a page with the desired instruction, addressed to the desired medical device 21.

In a next block 33, the medical device 21 receives the page via the paging module 22 and then extracts the instructions from the page. The paging module 22  
5 may be configured to send an acknowledgement page back to the two-way paging network 23 to confirm receipt of the page. Then in a block 35, the medical device 21 performs the extracted instructions. In a next block 37, the medical device 21, in this example, transmits a message back to the remote monitoring service 24 through the two-way paging network 23. In accordance with one two-way paging protocol, this  
10 "return page" is transmitted in a return channel that is different from the channel (i.e., frequency band) used to transmit the page initiated by the remote paging service 24 in block 31. This type of system can allow the medical device 21 to initiate transmission of the return page without having to wait to be polled by the two-way paging network 23. The return channel page or message contains self-test results,  
15 status data, or condition data, depending on the nature of the instructions sent by the remote monitoring service 24. A transmission from the medical device 21 can be immediately provided by the two-way paging network 23 to the remote monitoring service 24 via the same data transmission network that the remote monitoring service 24 used to initiate the page. For example, two-way paging network 23 may  
20 use a telephone/modem connection to transmit the data to the remote monitoring service. Alternatively, the two-way paging network 23 and the remote monitoring service 24 may be configured to store the return message in a "mail box" that the monitoring service 24 can later retrieve and analyze.

In a next block 39, the remote monitoring service 24 then extracts the  
25 information from the return page. This information can then be displayed for analysis by a technician at the remote monitoring service 24. Alternatively, the remote monitoring service 24 may be configured with a computer programmed to analyze the information. The remote monitoring service 24 can then alert a technician or even the customer when analysis of the information indicates a  
30 problem. It will be appreciated that in light of the present disclosure, those skilled in the art can implement without undue experimentation, a remote communication system for medical devices in which several medical devices are monitored by the remote monitoring service 24 using the two-way paging network 23. The remote monitoring service 24 would be configured to "poll" each medical device at least

once per day up to several times a day, depending on the number of medical devices and the capacity of the two-way paging network 23.

FIGURE 4 is a block diagram illustrative of medical device 21 (FIGURE 2) being implemented with a defibrillator, according to one embodiment of the present invention. Although a defibrillator is used in this embodiment, in light of this disclosure, those skilled in the art will be able to implement other embodiments using other types of medical equipment, without undue experimentation. In addition to the two-way paging module 22, the defibrillator 21 includes a controller 40, a power source 41, an energy storage device 42, an output circuit 43 and output electrodes 44 and 45. To facilitate understanding of the invention, the same reference number may be used in several drawings to indicate elements having the same or similar structure or function. In this embodiment, the two-way paging module 22 is implemented with a CreataLink2™ two-way paging module, available from Motorola, Inc. Schaumburg, Illinois. This embodiment uses the ReFLEX™ two-way paging protocol. Of course, in other embodiments, other suitable OEM (original equipment manufacturer) two-way paging modules and/or two-way paging protocols may be used.

In addition, the controller 40 includes a microprocessor (not shown) such as, for example, a model 68332 available from Motorola, along with a memory 46. Preferably, the memory 46 includes random access memory such as a DRAM (dynamic random access memory) or SRAM (static random access memory), and non-volatile memory such as an EEPROM (electrically erasable programmable read only memory). The EEPROM can be used to store software programs executed by the processor (not shown). In addition, the EEPROM allows the stored software programs to be remotely updated. The power source 41 is implemented with a battery, such as a LP500 battery available from Medtronic Physio-Control Manufacturing Corp., Redmond, Washington. The energy storage device 42 is implemented with a capacitor with a capacitance of about 190-200  $\mu$ F. The output circuit 43 is implemented in an H-bridge configuration, which facilitates generating biphasic output pulses. For example, the output circuit 43 can be implemented as disclosed in U.S. Patent Application Serial No. 08/811,833 filed March 5, 1997, entitled "H-Bridge Circuit For Generating A High-Energy Biphasic Waveform In An External Defibrillator" by J.L. Sullivan et al. In one embodiment, the controller 40, the power source 41, the energy storage device 42, the output circuit 43 and the electrodes 44 and 45 are the same as used in a LP500 AED available from Medtronic

Physio-Control Manufacturing Corp. That is, the hardware aspect of medical device 21 is basically equivalent to a LP500 AED with the addition of the two-way pager module 22, along with suitable software programming stored in the memory 46.

5           FIGURE 5 is a block diagram illustrative of the remote monitoring service 24 (FIGURE 2), according to one embodiment of the present invention. In this embodiment, the remote monitoring service 24 includes a modem 51, a control unit 52 and a user interface 53 having a display. The modem 51 is part of interface 27 (FIGURE 2) and is implemented with a standard commercially available  
10           modem. The control unit 52 is connected to the modem 51 and includes a standard processor and associated memory (not shown). The control unit 52 is programmed to initiate pages to be transmitted through the two-way paging network 23 (FIGURE 2), as described above in conjunction with FIGS. 2 and 3. For example, the control unit 52 may be programmed to initiate "self-test" pages to be sent to the  
15           medical device 21 (FIGURE 2) according to a programmed schedule. In particular, the control unit 52 would send a page request to the two-way paging network 23 (FIGURE 2) through the modem 51 as previously described, which would then broadcast the requested page to the medical device 21. In addition, the control unit 52 is programmed to process return pages transmitted by the medical device 21  
20           (FIGURE 2).

          In this embodiment, the control unit 52 is also connected to the user interface 53. This feature can be used to display the processed return channel page so that a user (not shown) can view the information contained in the received return page. The user can then analyze the displayed information and take appropriate  
25           action. For example, the return channel page may contain the results of a self-test initiated by the remote monitoring service 24. If the results of the self-test indicate that the medical device 21 failed the self-test, the user can then contact the customer (or the party responsible for the medical device 21) to take the medical device 21 to a repair facility. The user may also use the user interface 53 to initiate pages to the  
30           medical device 21. For example, this feature may be used to send a software update or reconfiguration information to the medical device 21.

          FIGURE 6 is a flow diagram illustrative of the operation of the remote wireless communication system 20 (FIGURE 2), according to another embodiment of the present invention. This embodiment utilizes the ability of some two-way  
35           pager protocols to support independent transmission of a return channel page to send



a message to the remote monitoring service 24. That is, the medical device 21 can send a page to the remote monitoring service 24 without first having received a page from the remote monitoring service 24. In a block 61, the medical device 21, in a self-monitoring process, determines the status of the medical device 21. For example, the medical device 21 may be an AED having a control unit (e.g., the controller 40 in FIGURE 4) that constantly monitors the voltage of its battery (e.g., the power source 41 in FIGURE 4) to detect if the battery voltage drops below a predetermined threshold level. This self-monitoring process may monitor other parameters or initiate self-tests on a regular basis. For example, some medical devices include an on-board controller and clock system. The medical device's controller can be programmed to periodically initiate self-tests. Alternatively, the medical device 21 may initiate such self-monitoring and/or self-tests upon being activated or after being used. For example, the medical device 21 may be programmed to initiate notification pages indicating when the medical device 21 is used or if the medical device 21 fails in an attempted use.

In a next block 63, the medical device 21 initiates a page through two-way paging network 23 to provide the status or self-test results to the remote monitoring service 24. Block 63 is performed in essentially the same manner as block 37 (FIGURE 3), except that in block 63, the return channel page is not in response to a page sent by the remote monitoring service 24. That is, the status or self-test results are generated by the medical device 21 and sent via return channel page to the remote monitoring service 24 without prompting by the remote monitoring service 24. This embodiment can be used to reduce the processing load on the control unit 52 (FIGURE 5) of the remote monitoring service 24 when a large number of medical devices are being monitored. Blocks 65 and 67 are then performed by the remote monitoring service 24 in essentially the same manner as blocks 37 and 39 (FIGURE 3), described above.

FIGURE 7 is a block diagram illustrative of a medical device 70 configured to provide information regarding the location of the medical device 70 to the remote monitoring service 24 (FIGURE 2), according to one embodiment of the present invention. In this embodiment, the medical device 70 includes the two-way paging module 22 (as described above in conjunction with FIGURE 2), a GPS (global positioning system) module 71 and a controller 73. In addition, the medical device 70 includes the normal medical device circuitry 75 that the medical device 70 would have to perform its intended medical functions. For example, if the medical

device 70 were an AED, the medical device circuitry 75 would typically include the power source 41, the energy storage device 42, the output circuit 43 and the electrodes 44 and 45 that an AED described above in conjunction with FIGURE 4.

5 In one embodiment, the controller 73 is the same as the controller 40 (FIGURE 4) with additional software programming to interact with the GPS module 71. The GPS module 71 is implemented with a standard OEM GPS module such as, for example, a suitable module of the SiRFstar I/LX Product Family, available from SiRF Technology, Inc., Santa Clara, California. The GPS module 71 is used to detect the location of the medical device 70 in the standard manner. In  
10 particular, the controller 73 is programmed to query the GPS module 71 to provide the current location of the medical device 70, which the controller 73 then causes to be transmitted to the remote monitoring service 24 (FIGURE 2) using the two-way paging module 22. The medical device 70 can provide its current location in response to a request from the remote monitoring service 24 as described above in  
15 conjunction with FIGURE 3, or on its own as described above in conjunction with FIGURE 6. This feature can be used to track the location of portable medical devices such as AEDs.

FIGURE 8 is a block diagram illustrative of a remote wireless and data network communication system 80 for use with medical devices, according to one  
20 embodiment of the present invention. System 80 is similar to system 20 (FIGURE 2) except that the two-way paging service 23 (FIGURE 2) includes a data network point-of-presence (POP) interface and the channel 26 (FIGURE 2) includes a data network interface 81. For example, the data network and data network POP may be implemented using the Internet and a website. In this embodiment, the remote  
25 monitoring service 24 is configured to send page requests for pages to remote medical devices (not shown) through the data network POP of the two-way paging service 23, using the data network interface 81. The data network interface 81 is configured to follow the procedures defined by the two-way paging service 23 for sending pages using its data network POP. In response to data network POP-based  
30 page requests from the remote monitoring service 24, the two-way paging service 23 sends out pages to the addressed remote medical devices in the standard manner. The remote medical devices then send return pages as described above. The return pages (and self-initiated pages) from the remote medical devices are processed by the two-way paging service 23, which then provides the pages from the remote medical  
35 devices to the remote monitoring service 24. As previously described, the two-way

paging service 23 may provide the return page via a standard telephone connection as previously described. Alternatively, the return page may be in the form of data network email.

5 In an alternative embodiment, the two-way paging service 23 may also support direct data network email page requests. This alternative embodiment is similar to the embodiment of FIGURE 8, except that the remote monitoring service 24 is configured to send page requests to the two-way paging service 23 by internet email rather than through accessing the data network POP of the two-way  
10 paging service 23.

FIGURE 9A illustrates the data network POP interface of the remote monitoring service 24 (FIGURE 8), according to one embodiment of the present invention. In this embodiment, the remote monitoring service 24 accesses the data network through a data network access provider 90. The remote monitoring service 24 includes an interface 91 for establishing a connection with the data  
15 network access provider 90 over a line 92. The interface 91 can be a standard modem and the line 92 can be a standard telephone network. Alternatively, the remote monitoring service can be connected to the data network access provider 90 using other types of communication technologies such as cable, integrated services digital network (ISDN), asynchronous digital subscriber line (ADSL), etc.

20 FIGURE 9B illustrates the Internet interface of the remote monitoring service 24 (FIGURE 8), according another embodiment of the present invention. This embodiment is similar to the embodiment of FIGURE 9A, except that the remote monitoring service uses a direct data network connection instead of a data network access provider 90. In this embodiment, the remote monitoring service 24 is  
25 connected to the data network by a server 93. The remote monitoring service 24 is connected to the server 93 via a line 95. The line 95 can be any suitable connection such as, for example, a direct cable connection, or an internal or Intranet network connection such as an Ethernet connection. Such direct data network connections are well known using commercially available equipment and software.

30 FIGURE 10 illustrates part of a remote wireless communication system 100 for use with medical devices, according to another embodiment of the present invention. The system 100 includes a conventional medical device 101 and a separate communication device 103. The rest of the system is as described in conjunction with FIGURE 2, with the medical device 101 and the communication  
35 device 103 replacing the medical device 21. The communication device 103 and the

medical device 101 include an interface 105 and an interface 107, respectively, for supporting communication between the devices. In one embodiment, the interfaces 105 and 107 form a RS-232-C bus connection.

5 The communication device 103 includes a paging module 22 as described above in conjunction with FIGURE 2. The communication device 103 has a controller 109 similar to controller 73 (FIGURE 7) and is configured to receive pages sent by the remote monitoring service 24 and pass instructions within the received pages to the medical device 101. In addition, the communication device 103 is configured to download data (e.g., self-test data) from the medical device 101 (either  
10 in response to the page from the remote monitoring service 24 or self-initiated) and send a page with the downloaded data to the remote monitoring service 24. The communication device 103 may also include a GPS module 71 (FIGURE 7) for tracking the location of medical device 101. This embodiment is advantageously used to upgrade existing medical devices that have a communication port.

15 FIGURE 11 illustrates part of a remote wireless communication system 110 for use with medical devices, according to another embodiment of the present invention. The system 110 includes a medical device 111 having a smart subsystem 113. The rest of the system 110 is as described above in conjunction with FIGURE 2, with the medical device 111 replacing medical device 21.

20 The smart subsystem 113 can be a smart battery similar to that disclosed in U.S. Patent Application entitled "Smart Battery With Maintenance And Testing Functions, Communications, And Display", Serial No. 09/237,193 filed on January 26, 1999, which is assigned to the same assignee as the present invention, except that the smart subsystem 113 includes paging module 22. The smart  
25 subsystem 113 includes a controller 115 that is similar to the controller 73 described above in conjunction with FIGURE 7, which allows the smart subsystem 113 to be configured to inter-operate with the paging module 22 as previously described.

The embodiments of the remote wireless communication system described above are illustrative of the principles of the present invention and are not intended  
30 to limit the invention to the particular embodiments described. For example, in light of the present disclosure, those skilled in the art can adapt the two-way paging communication system to medical devices other than AEDs without undue experimentation. In addition, those skilled in the art can adapt the two-way paging communication system to use other wired or wireless public data network interfaces  
35 or wireless telephone interfaces in other embodiments. Accordingly, while the

preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.

I claim:

1. A communication system comprising:  
a medical device having a two-way paging module;  
a two-way paging network; and  
a remote monitoring service,

wherein the remote monitoring service is configured to send a page to the medical device using the two-way paging network, the page including a request for information from the medical device, and wherein, in response to receiving the page, the medical device is configured to obtain the requested information and send a return message back to the remote monitoring service using the two-way paging network, the return message including the requested information.

2. The system of Claim 1 wherein the medical device is a portable defibrillator.

3. The system of Claim 1 wherein the page includes an instruction for the medical device to perform a self-test, and wherein the medical device is configured to perform the requested self-test in response to the instruction.

4. The system of Claim 1 wherein the page includes an instruction for the medical device to send status information back to the remote monitoring service and wherein the medical device is configured to obtain the status in response to the instruction.

5. The system of Claim 1 wherein the page includes configuration information to update the configuration of the medical device, and wherein the medical device is configured to update its configuration in response to receiving the configuration information.

6. The system of Claim 1 wherein the page includes software update information to update software stored in the medical device, and wherein the medical device is configured to update the software stored in the medical device in response to receiving the software update information.

7. The system of Claim 1 wherein the medical device is further configured to autonomously obtain medical device information and send a message

to the remote monitoring service using the two-way paging network, the message including the medical device information, the medical device information including status, self-test, or configuration information.

8. The system of Claim 1 wherein the medical device comprises:  
a controller with a memory;

a two-way paging module coupled to the controller,

wherein the controller and two-way paging module are configured to receive and process pages sent to the medical device by the remote monitoring service over the two-way paging network and further configured to send return messages to the remote monitoring service over the two-way paging network..

9. The system of Claim 1 wherein the remote monitoring service comprises:

a control unit, wherein in the control unit is configured to selectively initiate a page to the medical device using the two-way paging network;

an interface coupled to the control unit, wherein the interface is configured to support communication between the control unit and the two-way paging network;  
and

a user interface having a display coupled to the control unit, the user interface being configured to support transfer of information between a user and the control unit.

10. The system of Claim 1 further comprising a global positioning system (GPS) module coupled to the controller, wherein the controller and GPS module are configured to provide the information indicative of the location of the medical device to the remote monitoring service using the two-way paging network.

11. The system of Claim 1 wherein the medical device comprises a smart subsystem, the smart subsystem including the two-way paging module, and wherein the requested information is related to the status of the smart subsystem.

12. The system of Claim 11 wherein the smart subsystem comprises a battery for providing power to the medical device.

13. The system of Claim 1 wherein the remote monitoring service is configured to send a page to the medical device by communicating with the two-way

paging network through a data network.

14. The system of Claim 13 wherein the data network is an Internet.

15. The system of Claim 14 wherein the remote monitoring service is configured to use an Internet service provider to communicate over the Internet.

16. A method for a remote monitoring service to communicate with a medical device using a two-way paging network, the method comprising:

initiating a page from the remote monitoring service to the medical device using the two-way paging network, the page including a request by the remote monitoring service for information from the medical device;

receiving the page in the medical device;

obtaining the requested information in response to receiving the page in the medical device; and

sending a return message from the medical device to the remote monitoring service using the two-way paging network, the message including the requested information.

17. The method of Claim 16 wherein the page includes an instruction for the medical device to perform a self-test, and wherein the medical device is configured to perform the requested self-test in response to the instruction.

18. The method of Claim 16 wherein the page includes an instruction for the medical device to send status information back to the remote monitoring service and wherein the medical device is configured to obtain the status in response to the instruction.

19. The method of Claim 16 wherein the page includes configuration information to update the configuration of the medical device, and wherein the medical device is configured to update its configuration in response to receiving the configuration information.

20. The method of Claim 16 wherein the page includes software update information to update software stored in the medical device, and wherein the medical device is configured to update the software stored in the medical device in response to receiving the software update information.



21. The method of Claim 16 wherein the medical device is further configured to autonomously obtain medical device information and send a message to the remote monitoring service using the two-way paging network, the message including the medical device information, the medical device information including status, self-test, or configuration information.

22. The method of Claim 16 wherein the medical device is a portable defibrillator.

23. The method of Claim 16 further comprising determining a location of the medical device using a global positioning system (GPS) module and providing information indicative of the location of the medical device to the remote monitoring service using the two-way paging network.

24. The method of Claim 16 wherein the medical device comprises a smart subsystem, the smart subsystem including the two-way paging module, and wherein the requested information is related to the status of the smart subsystem.

25. The method of Claim 24 wherein the smart subsystem comprises a battery for providing power to the medical device.

26. The method of Claim 16 wherein the remote monitoring service is configured to send a page to the medical device by communicating with the two-way paging network through a data network.

27. The method of Claim 26 wherein the data network is an Internet.

28. The method of Claim 27 wherein the remote monitoring service is configured to use an Internet service provider to communicate over the Internet.

29. A defibrillator comprising:  
a power source;  
a charging circuit coupled to the power source;  
an energy storage device coupled to the charging circuit;  
an output circuit coupled to the energy storage device;  
a pair of electrodes coupled to the output circuit;  
a two-way paging module; and

a controller having a memory coupled to the two-way paging module, charging circuit and the output circuit, wherein the controller is configured to selectively cause the charging circuit to transfer energy from the power source to the energy storage device and to cause the output circuit to transfer energy from the energy storage device to the electrodes, and

wherein the controller is further configured to operate the two-way paging module to (i) receive a page from a remote monitoring service via a two-way paging network, the page including a request for information from the medical device, and (ii) send a message to the remote monitoring service via the two-way paging network, the message including the requested information.

30. The defibrillator of Claim 29 wherein the page includes an instruction for the defibrillator to perform a self-test, and wherein the defibrillator is configured to perform the requested self-test in response to the instruction.

31. The defibrillator of Claim 29 wherein the page includes software update information to update software stored in the defibrillator, and wherein the defibrillator is configured to update the software stored in the defibrillator in response to receiving the software update information.

32. The defibrillator of Claim 29 wherein the page includes an instruction for the defibrillator to send status information back to the remote monitoring service and wherein the defibrillator is configured to obtain the status in response to the instruction.

33. The defibrillator of Claim 29 wherein the page includes configuration information to update the configuration of the defibrillator, and wherein the defibrillator is configured to update its configuration in response to receiving the configuration information.

34. The defibrillator of Claim 29 wherein the defibrillator is further configured to autonomously obtain defibrillator information and send a message to the remote monitoring service using the two-way paging network, the message including the defibrillator information, the defibrillator information including status, self-test, or configuration information.

35. The defibrillator of Claim 29 further comprising a global positioning system (GPS) module coupled to the controller, wherein the controller and GPS module are configured to provide the information indicative of the location of the defibrillator to the remote monitoring service using the two-way paging network.

36. A defibrillator comprising:

a power source;

a charging circuit coupled to the power source;

an energy storage device coupled to the charging circuit;

an output circuit coupled to the energy storage device;

a pair of electrodes coupled to the output circuit;

a two-way paging module;

defibrillator control means for selectively causing the charging circuit to transfer energy from the power source to the energy storage device and to cause the output circuit to transfer energy from the energy storage device to the electrodes; and

pager module control means, coupled to the two-way paging module, for receiving and processing a page from a remote monitoring service via a two-way paging network, the page including a request for information from the medical device, and for sending a message to the remote monitoring service via the two-way paging network, the message including the requested information.

37. The defibrillator of Claim 36 wherein the page includes an instruction for the defibrillator to perform a self-test, and wherein the defibrillator is configured to perform the requested self-test in response to the instruction.

38. The defibrillator of Claim 36 wherein the page includes software update information to update software stored in the defibrillator, and wherein the defibrillator is configured to update the software stored in the defibrillator in response to receiving the software update information.

39. The defibrillator of Claim 36 wherein the page includes an instruction for the defibrillator to send status information back to the remote monitoring service and wherein the defibrillator is configured to obtain the status in response to the instruction.

40. The defibrillator of Claim 36 wherein the page includes configuration information to update the configuration of the defibrillator, and wherein the

defibrillator is configured to update its configuration in response to receiving the configuration information.

41. The defibrillator of Claim 36 wherein the defibrillator is further configured to autonomously obtain defibrillator information and send a message to the remote monitoring service using the two-way paging network, the message including the defibrillator information, the defibrillator information including status, self-test, or configuration information.

42. The defibrillator of Claim 36 further comprising a global positioning system (GPS) module coupled to the controller, wherein the controller and GPS module are configured to provide the information indicative of the location of the defibrillator to the remote monitoring service using the two-way paging network.

43. The defibrillator of Claim 36 wherein a processor and a memory are used to implement the defibrillator control means and pager module control means.

44. A communication circuit for use in conjunction with a medical device, a two-way paging network and a remote monitoring service, the communication device comprising:

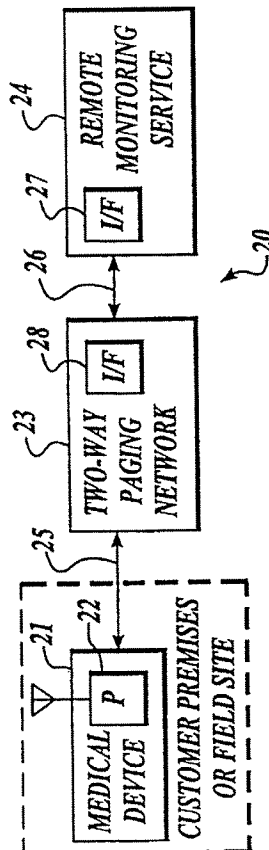
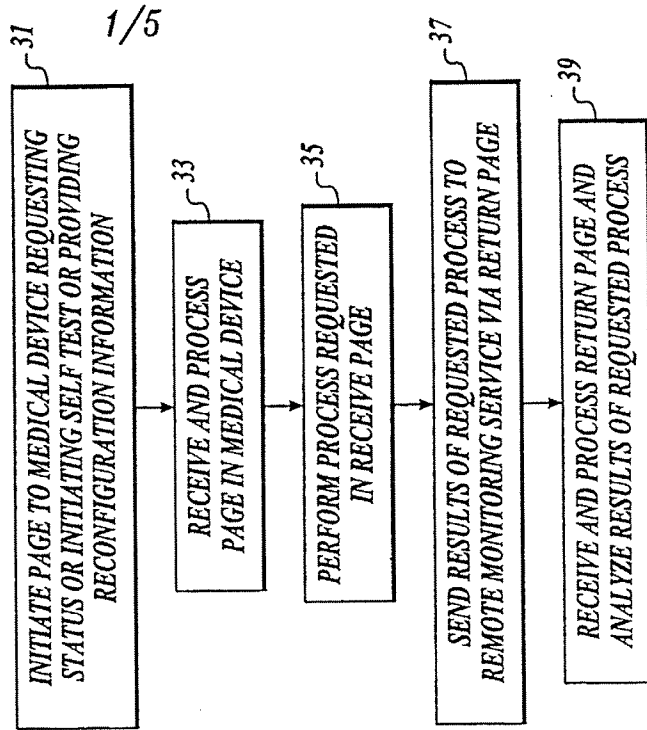
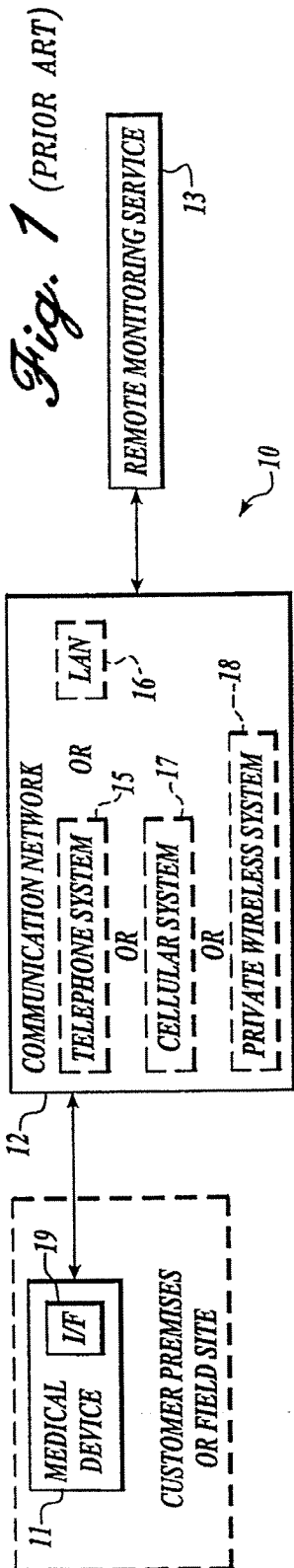
a controller; and

a two-way paging circuit coupled to the controller,

wherein in response to a page from the remote monitoring service using the two-way paging network, the page including a request for information from the medical device, the communication device is configured to obtain the requested information from the medical device and send a return message back to the remote monitoring service using the two-way paging network, the return message including the requested information.

45. The communication circuit of Claim 44, wherein the communication circuit is in a separate unit external to the medical device, the separate unit being configured to be selectively coupled to the medical device.

46. The communication circuit of Claim 45 further comprising a GPS module coupled to the controller.



*Fig. 3*

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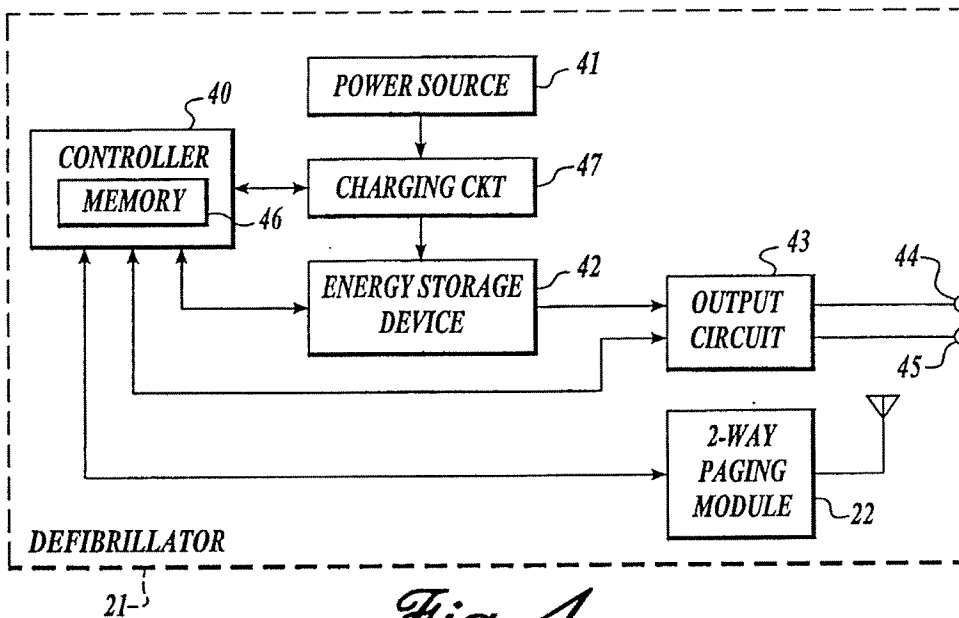


Fig. 4

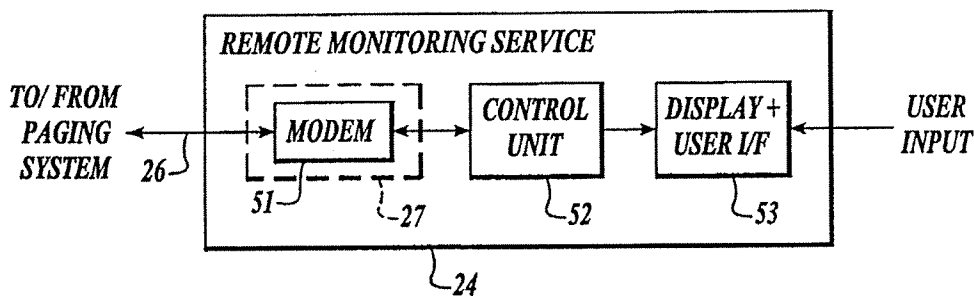
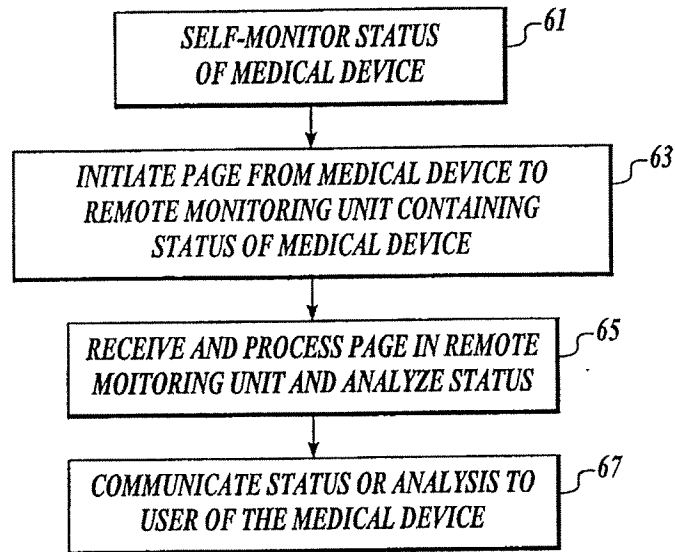
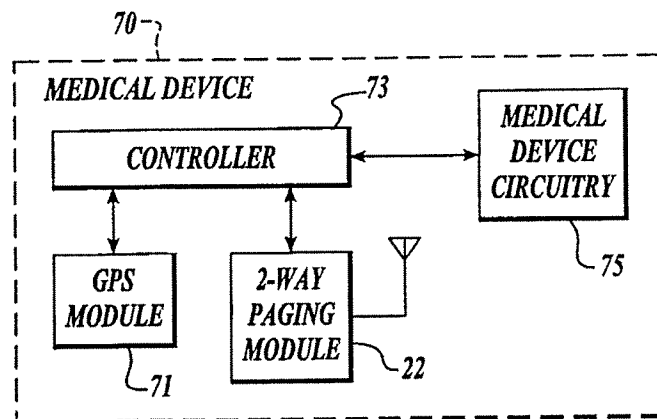


Fig. 5

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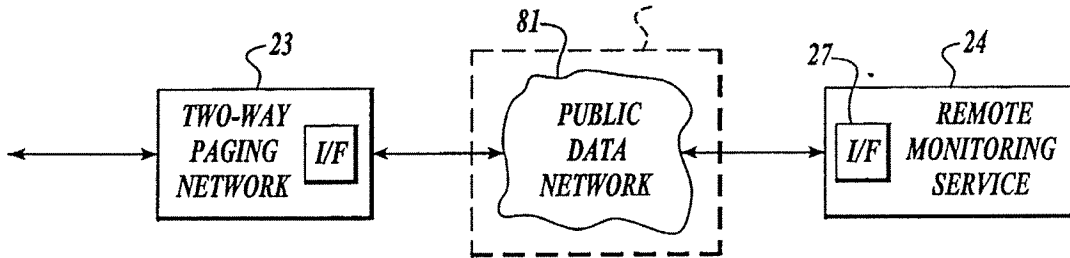
*Fig. 6*



*Fig. 7*

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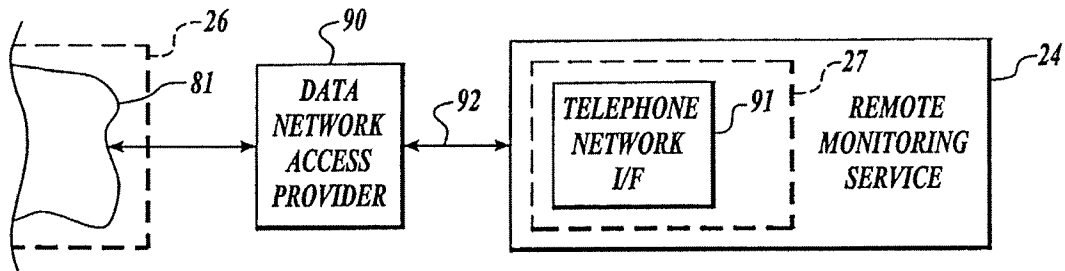
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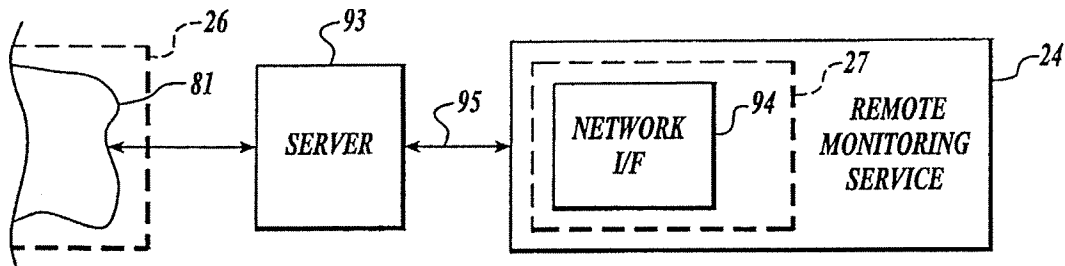
*Fig. 8*

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*Fig. 9.A*

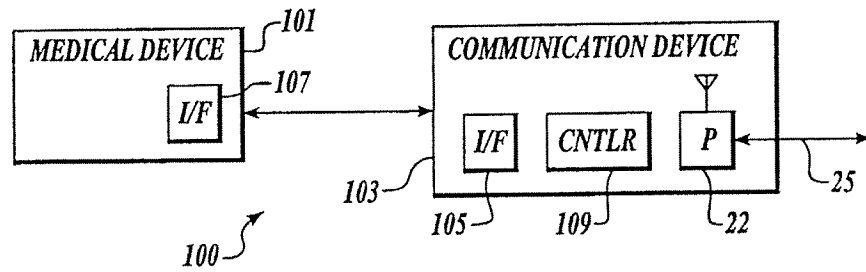


*Fig. 9.B*

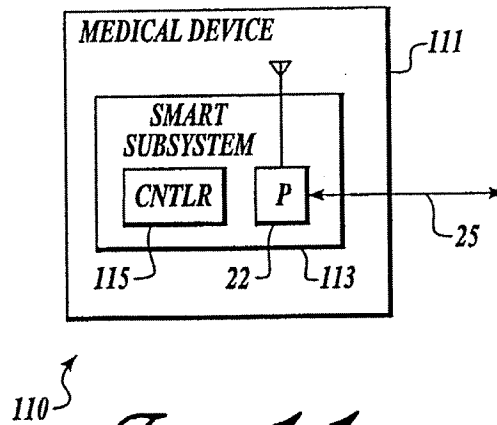
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*Fig. 10*



*Fig. 11*

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/13020

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/08 H04M11/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04M A61N

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>US 5 321 618 A (GESSMAN LAWRENCE) 14 June 1994 (1994-06-14)</p> <p>column 3, line 3 - line 57 column 4, line 19 - line 56 column 7, line 18 - line 56; figure 1</p> <p style="text-align: center;">-/--</p>	<p>1-6, 8, 9, 16-20, 22, 29-33, 36-40, 43-45</p>

Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

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Tsapelis, A

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 00/13020

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>US 5 337 044 A (ARNOLD DAVID ET AL) 9 August 1994 (1994-08-09)</p> <p>column 3, line 41 -column 4, line 57 column 5, line 1 -column 6, line 50 column 7, line 52 -column 8, line 4 column 10, line 5 -column 11, line 58; figure 1</p>	<p>1-6,8,9, 16-20, 22, 29-33, 36-40, 43-45</p>
A	<p>US 5 752 976 A (DUFFIN EDWIN G ET AL) 19 May 1998 (1998-05-19) column 4, line 34 -column 5, line 53 column 6, line 19 -column 7, line 30; figures 1,2,4,5</p>	<p>10,23, 35,42,46</p>

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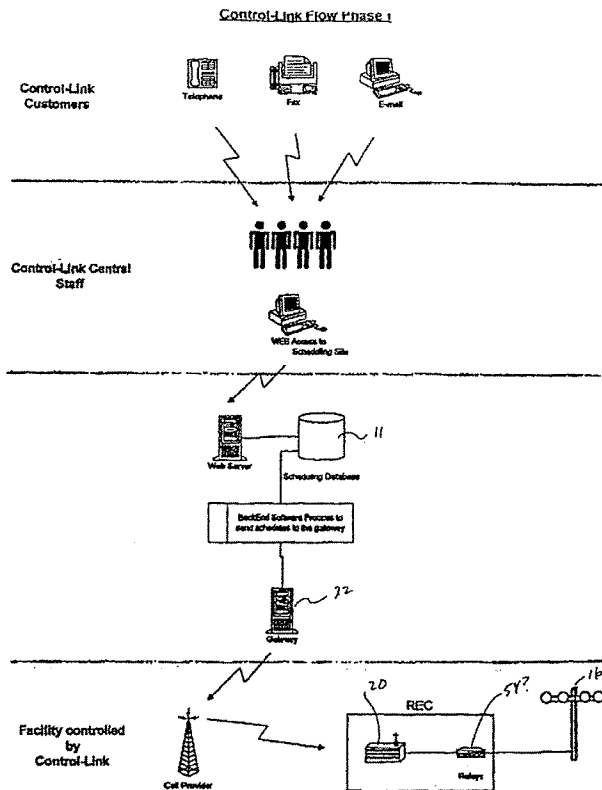
(US). RIVERA, Antonio [—/US]; 1013 North Market Street, Oskaloosa, IA 52577 (US). FOSTER, Michael, B. [—/US]; 2288 Lynn Avenue, Oskaloosa, IA 52577 (US). MARSH, Ryan, A. [—/US]; 520 High Avenue East, Oskaloosa, IA 52577 (US). TIPPETT, Walter, R. [—/US]; 501 21st Avenue West, Oskaloosa, IA 52577 (US). COOLEY, Patrick, K. [—/US]; 1105 Cedar Street, Wilton, IA 52778 (US).

(74) Agent: HANSING, Mark, D.; Zarley, McKee, Thomte, Voorhees & Sease, Suite 3200, 801 Grand Avenue, Des Moines, IA 50309 (US).

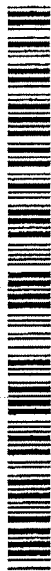
(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG,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

[Continued on next page]

(54) Title: MEANS AND APPARATUS FOR CONTROL OF REMOTE ELECTRICAL DEVICES



(57) Abstract: An apparatus to control remote devices or equipment via existing cellular telephone networks. The apparatus receives information from a customer concerning a specific function, which the customer wants to perform at the remote equipment. A Central Control receives this information from the customer and correlates the function to a specific cellular telephone MIN number, which has been pre-programmed in a computer at the Central Control. The MIN number is then sent to a cellular provider. The cellular provider then transmits the MIN number to an antenna, which transmits the MIN number to a remote equipment controller at the remotely located equipment. The remote equipment controller then takes a part of the MIN and gives these numbers to a PLC at the remote equipment controller. The PLC then memory maps the part of the MIN to a specific function to be carried out by the remote equipment controller. Then the remote equipment controller carries out specified functions at the remote equipment.



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

**Published:**

— *With international search report.*

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

5 Title: MEANS AND APPARATUS FOR CONTROL OF  
REMOTE ELECTRICAL DEVICES

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25 CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S.  
Provisional Application(s) No(s) 60/142,109 filed July 2,  
1999.



**BACKGROUND OF THE INVENTION***Field of the Invention*

The present invention relates to control of  
5 remote devices, and in particular, control of  
remotely located electrical equipment, including but  
not limited to, lighting systems.

*Problems in the Art*

Large area lighting systems are well known in  
10 the art. They can take many different forms. From  
baseball diamonds to playgrounds, to parking lots,  
to golf courses; large area lighting systems are all  
around in today's society.

In some instances, the lighting system is  
15 turned on and off automatically by timers, photo  
detectors, or other devices. This works reasonably  
well if the lights are used on a regular schedule or  
according to regularly repeating occurrences. In  
other cases, employees, staff members, or other  
20 persons must be hired or have the obligation to turn  
on and off the lights, particularly if the lights  
are used or needed only sporadically. Most of the  
time the person maintaining the lights will have to  
take care of several keys for several lights. These

people usually travel back and forth between the field and his/her home and even field to field because the lighting is commonly used during non-business hours. In the time it takes a staff member to travel, the lights have been unnecessarily left on. Such a problem is further compounded when the staff member is not informed that the lights are no longer needed for a certain event. When the lights are not turned off, this results in a waste of energy. This waste usually results in a waste of taxpayer's money. The waste of taxpayer money is furthered by the presence of vandalism, which often occurs to remote lighting systems.

An ancillary problem with manual control of large area lighting systems is that the person in charge normally must handle keys for the electrical boxes or buildings in which the switches or breakers are located to turn the lights on and off. Access by the public at large to the switches is usually blocked for safety, economic, and practical reasons. Such keys must to carefully handles and be available to control the lights. This can be cumbersome.

There has been some work done with computerized control of electrical loads or systems. The computer can have a database of instructions that could include turning a device on or off. The

computer could utilize its internal clock or other  
criteria to issue commands. However, such systems  
generally require a dedicated computer to control  
each device or no more than several devices at a  
5 location. Such systems also generally require  
special interactive software developed for each  
application. To change operation of the computer it  
must be reprogrammed, or new software must be  
installed. Either case requires significant time  
10 and expense.

Some attempts at remote control have been made.  
One example uses established paging systems as the  
carrier of instructions to remotely located devices  
which are to be controlled. Paging systems are  
15 attractive because they have currently developed to  
a point where they can carry a significant amount of  
digital data instructions. However, they can be  
somewhat costly, including communication costs.

The paging system could include a central  
20 repository of instructions. Control of remote  
devices based on the central repository is  
accomplished by sending out paging messages with  
control instructions carried therein to a paging  
receiver at the remote device. While this can  
25 eliminate many of the problems associated with other  
methods of operating lighting systems, a major

deficiency with paging systems presently exists. In the United States, paging systems cover most densely populated geographic areas. Most major-sized cities have good coverage. However, coverage is lacking in many other places. Of course, electrical devices, including large area lighting systems, are not limited to big cities. In fact, the need for remote control of devices may be more urgent in less densely populated areas. Thus, while paging systems offer some promise, they simply will not work in some areas because paging communications do not reach those areas.

Furthermore, paging systems tend to be one-way only, and therefore of limited capacity and options. Two-way paging is presently only in development. Digital paging systems are also in development, but it is estimated that infrastructure for substantial geographic coverage is several decades away.

Remote control of devices using DTMF signaling is in use. An example is remote control of the functions of an answering machine by pressing different telephone keys. This can be accomplished over regular or cellular phones. However, because it involves establishing a telephone connection with the remote device, it must use the voice channels. This is not satisfactory. Voice channels are not

always available. They can be unreliable. This also involves the cost of using the voice channel while communicating the instructions.

A wireless communications system with more  
5 geographical coverage is the cellular telephone system. It is attractive because of this broader geographic coverage and its existent infrastructure. Therefore, like the paging network, capital costs of developing and installing a new  
10 infrastructure could be avoided. It is also attractive because it has a built-in confirmation function. However, it is extremely limited in the data that it can carry, especially out to remote devices, without invoking its voice channels. For  
15 example, because of inherent limitation in the present cellular communications protocol in the USA (Advanced Mobile Phone Service or AMPS), it may be able to carry only three digits of instructions in each call via the last four digits on each cellular  
20 phone's Mobile Identification Number (MIN), a ten digit number in the form of a conventional telephone number; i.e. abc-def-wxyz, where a,b,c,d,e,f,w,x,y, and z are a single digit including and between 0 and 9, and where abc is the area code (three digits),  
25 def is the identification of the local central switching office (CTO) for the land based telephone

system (three digits), and wxyz is a four digit identification for the phone (equivalent to the "line" number in conventional phone systems). This is well-known and widely documented.

5 Under Federal Communications Commission (FCC) regulations, two cellular phone carriers for each geographic area are each given 416 duplex voice channels, and 21 control channels. Carrier 1's channels are called the A channels and carrier 2's  
10 channels are called the B channels. Forward control channels (FOCC's) are from the cell base station to a cell phone; reverse control channels (RECC's) are from the phones to the base station. Under AMPS protocol , up to three digits in the MIN can be  
15 used for carrying data on the forward control channels.

An advantage of using the control channels of AMPS is that the messages are cheap because they are short and do not involve the voice channels. Also  
20 the control channels are transmitted at higher power than the voice channels, have better error correction and better frequency use, and have less traffic. Therefore, they are more reliable as a communication link.

25 Therefore, current cellular telephone systems and protocols (e.g. Advanced Mobile Phone System

(AMPS) in North America; other similar analog systems are NAMPS and ENAMPS) are simply unacceptable because of the limitation of information that could be included as instructions or control in cellular calls.

To have meaningful control of remote devices usually requires communication of more than three digits of instructions. At a minimum, this limitation would not allow an acceptable level of flexibility for many applications.

Also, the utilization of MINs to both serve to instigate a cellular call and, with the same number, effect an operation (e.g. turning lights on or off) at a remote site is not indicated as a realistic use of MINs or the cellular network.

One example of a cellular telephony based remote control system is that of Cellemetry of Atlanta, Georgia. It provides the means of sending short, telemetry-like messages over the cellular telephone system. Examples include reporting (a) alarm panel status, (b) utility meter readings, (c) vehicle and trailer location, and (d) vending machine status. It does utilize the overhead control channels (FOCC's and RECC's) of cellular telephone systems to communicate the information.

However, its primary uses involve transmitting data

or information or status from remote locations to a central location.

One specific example involves soft drink vending machines. Reports can be communicated to a central location regarding how much product has been sold and/or how much money has been received and/or how much change has been dispensed. Another example involves turning off a machine or turning security on at the machine. However, there is no known ability with such systems to have individualized schedules or control options at each remote device that can be handled via the three digits of a cellular control channel registration message sent over the FOCC.

Such a system could use different MINs to set and reset flags in a programmable logic controller (PLC), for example, through a single input/output port, but there is no known controlling of resistive or inductive loads with MINs mapped in a PLC memory to functions. There is no known instruction set coded to MINs. The problem is one of availability of MINs. If each remotely positioned PLC with a cellular radio were given ten instructions to which it would respond, the cellular carrier would have to provide ten unique and distinct MINs for each such radio. If there were only two radios, only 20 MINs



would be needed. But one hundred radios would need  
1000 MINS. One thousand radios would need ten  
thousand MINS and so on. If there are any  
meaningful number of remote devices to be controlled  
5 (and remote radios), there would not be enough MINS  
or the number of MINS per phone would have to be  
restricted.

Essentially, cellular systems have wider  
coverage geographically than paging systems, but  
10 much more restricted data capacity. Therefore,  
cellular systems are not indicated to be viable  
candidates for flexible remote control of devices.

There is no known existing system that remotely  
controls resistive or inductive electrical loads  
15 according to a centralized schedule through the  
cellular system control channels.

The state of the art has not revealed a way of  
solving the conflicting concerns of cost, capacity,  
and coverage relative to centralized, automated  
20 control of multiple remotely located electrical  
devices. Therefore, there is a need for improvement  
in the art.

*OBJECTS, FEATURES, AND ADVANTAGES OF THE  
INVENTION*

A principal object of the present invention is therefore to provide an apparatus and method of  
5 controlling remotely located devices, which improves over or solves the problems and deficiencies in the art.

Other objects, features, and advantages of the present invention is to provide an apparatus and  
10 method as above described which:

a) Is wireless.

b) Does not require specialized lighting control software or the need for distributed software or updates.

15 c) Facilitates low cost use of communications networks (e.g. control channel of cellular, Internet).

d) Does not require a dedicated PC at each remote location.

20 e) Does not require a telephone line for each remote location and eliminates expensive installation of phone lines.

f) Does not require additional phone lines or hard wiring.

25 g) Reduces human time and the chance of human error.

- h) Is cost effective.
- i) Reduces staff legwork and time traveling from location to location, before or after events.
- j) Eliminates human resources, time, and cost to  
5 physically travel to location(s) and manually operate the remote devices.
- k) Saves energy by operating the remote devices only when they are needed.
- l) Uses existing communications infrastructures  
10 (e.g. Internet, telephone networks, cellular networks).
- m) Allows for centralized support services.
- n) Provides for easy training of end users (operators, customers, and interested persons).
- 15 o) Optionally provides a confirmation sent for each new schedule or change.
- p) Is especially flexible for variable schedules at multiple locations.
- q) Saves time.
- 20 r) Saves money.
- s) Can be predominately automated.
- t) Allows for centralization of data yet distribution of individualized control at each remote device.
- 25 u) Reduces need to distribute and track multiple sets of keys.

v) Is vandal resistant.

w) Has significant flexibility.

x) Is retrofittable.

y) Adapts to existing facilities, systems and  
5 devices.

z) Is expandable and upgradeable.

aa) Is reliable.

bb) Does not tie up voice channels.

These and other objects, features, and  
10 advantages of the present invention will become more  
apparent with reference to the accompanying  
specification and claims.

#### SUMMARY OF THE INVENTION

The present invention involves methods and  
15 apparatus for controlling remote devices or systems.  
The present invention details a way for a user to  
control a plurality of functions at a remote device  
or location by using the existent cellular telephone  
system, a control center, and a remote equipment  
20 controller at each remote device or system.

A control center is established, preferably  
including a computer. An end user of a remote  
device or system can contact the control center,  
including via Internet, e-mail, phone, cell phone,  
25 fax, or even mail, to request performance of

operations by the remote device or system according to a schedule. The control center stores the schedule and assigns or codes the desired request to one or more MINS (mobile identification numbers) of a cellular telephone system. The MIN is a ten digit number which correlates to a cellular phone number. The control center is assigned a plurality of MIN's assigned by a cellular carrier. The MIN's can be designated with area codes that are not accessible by common carriers. Therefore, a standard cellular phone cannot be called using the MIN's assigned to the central location.

The remote equipment controller includes a processor with memory that is pre-programmed with the authorized MINS and functions for the particular remote device. The processor is operatively connected to components that can effectuate a function in the remote device upon appropriate instruction from the processor. When the schedule indicates an action should occur at the remote device, the control center retrieves the MIN for the function chosen by the user, and the MIN is sent to the cellular provider. The cellular provider then calls the MIN of the remote radio located on the remote or system. Once the radio receives the call from the cellular provider, it passes all ten

digits of the MIN to the processor (e.g. a PLC or programmable logic controller). The processor uses a memory lookup table to map the digits (e.g. the last three digits of the MIN) to a specific pre-

5 programmed function. Once this function is located, the processor then performs this function. Thus, the remotely located device can be controlled, even according to multiple instructions, by communication through the very limited data headroom of the

10 control channel of a cellular telephone system.

Central control can utilize what is called a gateway to the cellular network to communicate to the remote cellular radios and to store both the schedules and the coded MINS.

15 As used herein, the terms "central control" or "control central" refer sometimes to "central control" alone and sometimes to "central control" and a dedicated gateway to the cellular network. In other words, the functions attributed to central control could be

20 performed with appropriate components completely at central control, or some functions (e.g. storing of database, use of database, interface with the cellular network) could be delegated to another system, such as a gateway system, as will be further discussed below.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagrammatic overview of a system according to a preferred embodiment of the invention.

5        Figure 2 is a diagrammatic overview of how instructions are communicated from a control center ("Central Control") to a plurality of remote devices.

10       Figure 3 is a diagrammatic overview of how persons communicate with Central Control.

Figure 4 is a diagrammatic depiction of voice and control channels relative to a cellular transceiver.

15       Figure 5 is a simplified diagram illustrating area code geographic coverage for the United States according to a preferred embodiment of the invention.

20       Figure 6 is a simplified diagram illustrating local central switching office geographic coverage for an area code of Figure 5.

Figure 7 is a simplified diagram illustrating mobile identification number geographic relationship for local central switching office coverage of Figure 6.

Figure 8 is a diagrammatic depiction of the system of Figure 1 with respect to a remotely located lighting system for a ball field.

Figures 8B and 8C are an additional  
5 diagrammatic depictions of the system of Figure 1.

Figures 9 and 9B is a diagrammatic view of a Remote Equipment Controller of the lighting system of Figure 8.

Figure 10 is a depiction of a lighting schedule  
10 for the ball field of Figure 8.

Figure 11 is a depiction of a data table filled out and placed in an REC or LCC to set forth which contactors and relays control which zones of a lighting system.

Figure 12 is a diagrammatic depiction of how  
15 control instructions are sent and implemented at the ball field.

Figures 13-15 are screen displays of a graphic user interfaces for entering schedule information at a web  
20 site, either of central control or a gateway. Figures 16-21 are examples of forms used to collect data for inclusion in the database used to control the remote devices and to communicate with customers.

Figure 22 is a diagrammatical illustration of the  
25 data structure of a schedule according to an embodiment of the invention.



Figure 23 is a diagrammatic depiction of a communication according to an embodiment of the invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

5 To assist in a better understanding of the invention, a detailed description of a preferred embodiment will now then be set forth. It is to be understood that this describes but one specific form of the invention can take, and that others are  
10 possible. Appended drawings will be referred to as description.

A brief overview of the preferred embodiment in the particular environment for this example of the invention will be given. A specific description of  
15 the structure or physical components of the preferred embodiment will follow. Thereafter, a discussion of how the structure functions in its working environment will be set forth. Finally, operational matters and features, as well as  
20 alternative embodiments, will be discussed.

#### OVERVIEW

This embodiment will be discussed in the context of remotely controlling lighting systems at a number of remote locations. However, it is to be  
25 understood that the invention can be applied in a

variety of ways to a variety of remotely located equipment.

The general concept of a system according to the preferred embodiment is illustrated in Figure 1.

5 What will be called Central Control 10 includes a computer having a significant amount of memory and processing power. A plurality of lighting systems 12, located remotely from Central Control 10, each include what will be called a Remote Equipment  
10 Controller (REC) 14 which includes components that can turn lights 16 for each ballfield 18 on or off. REC 14 further includes a cellular phone or radio 20.

As shown in Figures 1 and 8C, Central Control  
15 10 is in communication with a dedicated gateway system 22 (DGW), which in turn is in communication with the Intersystem Signaled Network (ISN IS-41) 24 that interlinks all the cellular phone systems in the U.S.

20 Central Control 10 and/or gateway system 22 includes a database of on-off schedules 11 for each lighting system 12. At the appropriate times, software and equipment at Central Control 10 (or gateway 22) instigates a call to the appropriate  
25 radio 20. As will be discussed in more detail below, through this procedure REC 14 can be

instructed to turn the corresponding lighting systems 12 on or off, according to schedule. Thus, control of all the remotely located lighting systems can be accomplished from a central location, in a wireless manner to wherever cellular communications can reach (which is almost the entire U.S.), and in an automated, labor-saving, cost-effective fashion.

As further illustrated in Figure 1, the system could also allow input from what will be called customers 26 and interested persons 28. Examples of customers are municipal park and recreation departments, school districts, and athletic associations. Interested persons can be athletes, parents, or fans of athletic teams using ball fields 18, and thus interested in game times and locations.

Customers/interested persons 26/28, through conventional means such as personal computers, can access Central Control 10 through Internet 30. Schedules and other information regarding the games or use of ballfields 18 would be available to authorized persons. Additionally, authorized persons could communicate changes to schedules 18, post messages, or submit other information to Central Control 10, so that schedules 18 or other important information could be kept current.

By referring briefly to Figure 8, a personal computer 32, phone 34 or fax 36 could be used by customers 26 to transfer information to Central Control 10 which then instructs the REC's 14 accordingly over the cellular network.

The personal computer, phone or fax (or other communication method) transfers to Central Control 10 information concerning functions the customer wishes to perform at the remote lighting system 12. Central Control 10 matches the request of the customer with a cell phone 20 MIN and then sends it to the REC 14. The REC 14 receives the MIN; interprets this as a function and controls the lights 16 of lighting system 12 in the desired way.

Such a system can be used for a variety of different purposes. Examples are lights at baseball fields, parks, golf courses, swimming pools, parks and bike trails. Other examples are possible.

#### **APPARATUS**

##### **Schedules**

As explained above, customers 26 can utilize input devices such as PC's 32 (e.g. e-mail), telephones 34 or facsimile machines 36 to send in or make changes to schedules 11. These are all

conventional components widely available to the public.

For example, Figures 16-21 illustrate examples of forms that could be given to customers or interested persons. The filled-out forms would be returned to Central Control 10.

The input from customers 26 could be processed by employees at Central Control 10, and then entered into a database of schedules 11.

For example, Figure 16 asks the customer for identification information, security information (section 1), how to contact them either by email or fax (section 2), non-recurring lighting ON or OFF for each lighting zone (section 3), and recurring lighting ON and OFF functions for each zone, including date (section 4). The customer fills this in and faxes, emails, mails, or otherwise gets this to Central Control 10.

Figure 17 provides a form so that information about how the relays are wired can be compiled for entry into the database.

Figure 18 provides a form so that information regarding customers can be compiled and entered into the database to keep track of end users of the lights and make monthly reports to the customers regarding light usage, etc.

Figure 19 describes the facility itself as well as the time zone and whether daylight savings time applies. The database needs this because it is keyed to Greenwich Mean Time.

5 Figure 20 compiles information about the facility owner or authorized agent(s) so that only authorized individuals can send scheduling information to Control Central. It also allows verification of a schedule or schedule change by  
10 Control Central.

Figure 21 is an additional form to compile information about the user of the lights or the facility being lighted.

Figures 13-15 are examples of graphic user  
15 interfaces or screen displays for accessing and entering scheduling and other information into the database. Figure 13 shows that access preferably is password protected. Figure 14 shows that a variety of options could exist relative to use of the  
20 database, including entry of or changing of schedules (see button labeled "Output Control").

Figure 15 shows a web site screen after selecting "Output Control" on Figure 14. Central Control would enter a MIN of a radio 20 in "Unit  
25 Number". If immediate override (see "Immediate Control") of an existing schedule is required (e.g.

if a customer has just called Central Control and asked to turn on lights currently to off according to the existing schedule), Central Control could override the existing schedule right then for any of  
5 the relays/contactors 1-8 for that lighting system.

The "Schedule" section of Figure 15 allows Central Control to enter the schedule for each relay/contactator (Op 1 to OP 8) for that lighting system, including which days of the week and which  
10 months of the year. The "once" column is for single, non-recurring events (from section 3 of Figure 16). Otherwise, the schedule will recur (from section 4 of Figure 16). Changes can also be made to the schedule.

#### 15           **Internet**

Through standard e-mail, customers can send schedule requests to Central Control 10 over the Internet, and optionally get confirmations back the same way. An advantage of use of Internet 30 is  
20 increasing availability to the public, including at their homes, and its availability almost anywhere and anytime, but with no or limited communications cost.

Internet 30 could also be used to communicate  
25 between Central Control 10 and gateway 22. The

gateway provider could set up and maintain a web site with appropriate user interface and security for these purposes. There is no need for special distributed software to customers 26 or interested persons 28, or the need for dedicated computers at ballfields 18. See Figures 13-15.

#### Central Control

Central Control 10 (in this example via gateway 22) performs a variety of functions. The functions can be as diverse and detailed as desired. For example, control central sends messages over cellular network 24 to the REC's 14. It also can send confirmations that scheduling information has been entered, that a scheduling function has been performed, that a schedule change has been made, etc. to customers 26 via e-mail or fax.

Employees at Central Control 10 review and properly format schedules and deal with scheduling conflicts or other problems. Control central includes a computer (e.g. Dell Computer Corporation PowerEdge Server) with firmware and appropriate software secure from users. A database is maintained to store the scheduling information.



### Communications

To better understand the system of the preferred embodiment, the communications between the components of the system must be understood.

5 Figures 2-7 illustrate the basic communications concepts.

The system relies on the ability to reach a variety of remote locations in a wireless manner by relying on the cellular phone network. Figure 2  
10 illustrates this in more detail. Control central 10 is located in State C, City 1. In this example, there are seven lighting systems (numbered 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, and 12-7) to be remotely controlled by control central 10. Lighting systems  
15 12-1, 12-2, 12-3 are located in State A, City 1. Lighting systems 12-4 and 12-5 are located in the same State A, but in City 2. Lighting systems 12-6 and 12-7 are located in a different State C, and City 1 in State C.

20 City 1 of State A has a cellular carrier C1 that covers City 1 of State A with cells C1-1, C1-2, C1-3, and C1-4. Cellular communications to those cells is controlled by Mobile Telephone Switching Office 40-C1. Carrier C2 covers City 2 of State A  
25 with cells C2-1 to C2-7, which are controlled by MTSO 40-C2. Carrier C3 covers City 3 of State B

with cells C3-1 to C3-3, which are controlled by  
MTSO 40-C3.

Intersystem signaling network (IS-41) -  
connects all Internet carriers

5  
Central Control 10 is located in still a third  
State, namely State C, in City 4. As is well-known  
in the art, Central Control 10 (via gateway 22) can  
communicate with any of the cells of cellular  
10 systems C1, C2, or C3 by using conventional land-  
line telephone gear and dialing up a cellular phone  
in any of those geographic areas. A high speed  
dedicated connection (SS7) between Central Control  
10/gateway 22 and the IS-41 signaling network 24 can  
15 be made. A backup dial-up modem connection can be  
available. Cellular systems C1, C2, and C3 are  
hooked up by high speed dedicated connections to the  
intersystem signaling network (IS-41) 24 that  
20 Central Control 10 or gateway 22 is in one City in a  
first State and a lighting system 12 for a ballfield  
18 in another City in another State, communication  
can be made if the ballfield City is covered by a  
cellular system.

### Cellular carriers

As is further well-known in the art, each cell of each cellular system has a base station 42 which includes a transceiver 44 and an antenna 46 (see 5 Figure 4). The MTSO 40 associated with each collection of cells communicates with any of the base stations 42 in its system (via land-line or wireless). The base stations then communicate in a wireless fashion to the cell phones 20.

10 Mobile Telephone Switching Office (MTSO), sometimes referred to as an MSC, is established by each cellular carrier in each city or for each collection of cells. It is like a CTO (central telephone office) of conventional land-line phone 15 systems in that it coordinates calls to and from phones in the area which it covers. The MTSO also connects its cells to the conventional land line telephone system and controls the base station in each of its cells.

20 This wireless ability, along with the existing infrastructure illustrated in Figure 2, allows Central Control 10 (via gateway 22) to communicate with remotely located REC's 14 without the huge capital investment of creating a new infrastructure, 25 or laying dedicated land-lines to each REC.

### Conventional phone system

The conventional land-line telephone system 22 utilizes central telephone switching offices or CTO's distributed around the country, one for each 5 area code. Communications can go into the conventional telephone system at various times.

This is illustrated in Figure 3. If a customer 26 wishes to communicate with Central Control 10, one way is via a land line call (either voice or 10 fax). Other ways are via a cell call (which could in part involve land line telephone), or via e-mail (again usually by Internet 30). It is even possible for a customer to make a personal visit to Central Control 10 to seek or convey information.

### 15 Cellular phone or radio

Cell phones 20, also referred to as radios 20, are conventional cellular radios. An example is an Ericsson TXR module AM10 AMPS cellular radio (cellular receiver). Such components are relatively 20 small (roughly 2" W by 4" L by 1/2" D), are durable (mostly solid-state), and relatively inexpensive.

The mechanism to send a part of the MIN from radio 20 to PLC 50 is as follows. An AT modem command (industry standard) emulates modem 25 communication protocol and allows radio 20 to talk

to PLC 50 through a serial data port. The communication is full handshake, full duplex and approximately 2400 baud.

#### AMPS Communication Protocol

5 As previously discussed, a significant aspect of AMPS cellular communication is the precise way in which cellular calls are routed. It is important to an understanding of the present invention, to understand this.

10 Figure 4 illustrates one cellular radio 20 in cell C1-1 of cellular system C1. Base station 42 of cell C1-1 services radio 20 and is connected to MTSO 40-C1 of system C1, which in turn is connected to the IS-41 intersystem network 24.

15 MTSO 24, through base station 42, communicates with radio 20 as follows. Forward control channel FOCC and reverse control channel RECC allow the base station 42 and the radio 20 respectively to communicate call initiation information and perform  
20 other functions. Forward voice channel FOVC and reverse voice channel REVC carry the voice messages (audio) to and from radios 20.

Conventionally, use of the FOCC and RECC are for very short times and traffic over these channels  
25 is not as high as the voice channels, where the real

voice communication occurs. Conventionally, FOCC and RECC are primarily used to register radio 20 to enable it to receive or make a call.

As described earlier, because FOCC and RECC are primarily used in this manner, and because of the AMPS protocols, the amount of data communicated over these control channels is limited. Specifically, information on the FOCC when initiating a remote call to radio 20 is limited to essentially the MIN, that is, ten digits in the abc-efg-wxyz format described above. To reach radio 20, the first six digits can not be altered. The first three (abc) are the area code for the call, directing the call to the general geographic area of the home cellular system for the cellular radio 20. The next three (efg) are the local CTO number, a further geographical narrowing. The final four digits of the MIN (wxyz) are an identification number for the specific radio 20 so that the call knows which radio it is supposed to be directed to.

If the MIN sent out by the caller matches with the MIN of the called radio 20, the cellular system assigns the frequencies for the voice channels FOVC and REVC, the duplex communication can begin. Prior to that assignment of a voice channel, all of the

signaling is accomplished solely over the IS-41's FOCC and RECC.

Thus, in the instance of Figure 4, if cellular radio 20 has the MIN of 080-377-4000, a call from  
5 Central Control 10 (via gateway 22) would involve dialing that number. The MIN would be carried over IS-41 (reference numeral 24). As is well-known in the art so that it will not be described in detail here, the IS-41 network 24 is able to discern the  
10 "home" cellular system for that MIN, but also can discern where the radio 20 matching the MIN is currently at geographically (because radio 20 periodically sends out its MIN and lets the intracellular network know where its at).

15 Thus, the registration process that is used by the cellular telephone system to prepare for a call to a cellular phone is used here. What is sometimes actually referred to as a "page" is made through the cellular network to the cellular phone being called.  
20 The cell phone must tell the cellular system that it is on and ready. The cellular network notifies the entire USA of this (or more accurately, notifies all geographic areas covered by the IS-41 intersystem network). The cell phone scans for the strongest  
25 FOCC to get to nearest base station and sends its MID/ESN/and home system SID (all goes to the

relevant MTSO). The cell phone is registered with local cellular system if everything checks out.

If the home cellular system validates the MIN, the call is registered and is ready to commence. In this example, the radio having the MIN of 080-377-4000 would receive its MIN over the FOCC. This registration process, taking only hundreds of milliseconds, is essentially a "page" which lets the nationwide intra cellular network know that remote phone 20 has come on-line. It is important to note that over the FOCC, only the ten digit MIN is sent to radio 20. In the forward direction (over FOCC from base 42 to radio 20), only three digits of the MIN are available to carry information.

Radio 20 sends the ten digit MIN as well as a 32 bit Electronic Security Number or ESN over the RECC, and therefore only from radio 20 back to base station 42. Thus, the 32 bits are not available in the forward direction for instructions to REC 14. Other information may be sent over the forward or reverse control channels (e.g. home system ID), but such does not change the basic fact that the only "data" so to speak that might be carried over the FOCC (base 42 to radio 20) in the MIN is the last three digits of the MIN. For reasons dictated by the AMPS protocol, only the last three digits are



potentially utilizable for carrying data or instructions.

Therefore, as discussed above, one would be deterred from looking to the AMPS limitation of three possible digits in the FOCC, if one were looking for a way to send digital instructions. However, it is in this very environment that the preferred embodiment functions.

As shown in Figure 4, radio 20 according to the preferred embodiment is given anywhere from one to a substantial plurality of MIN's to which it will respond. Taking again the example of a MIN in the form of 080-377-4000, Figure 5 shows how the USA for example, is divided up into a plurality of area codes 080 through 087. A call from Central Control 10 to 080-377-4000 would route the call to the 080 area code, here illustrated to be in the Northwest part of the United States.

Figure 6 illustrates that the geographic extent of area code 080 is sub-divided into a plurality of regions 370 to 377, each serviced by a CTO 38. Each region is identified by the three digit number and therefore in this example the call is routed to CTO identified by "377".

Figure 7 illustrates that CTO 377 would provide the MIN to the appropriate MTSO 40, which would

track down the cell (here C1-1) receiving the strongest signal or vice versa relative to the radio with the MIN 080-377-4000, and sends the MIN over the FOCC at base station 42 in cell C1-1, to that  
5 radio 20. Thus, radio 20, responding to this called number or MIN, is found in msec over the cellular network control channels.

#### Gateway

In one embodiment of the invention, a third  
10 party administrator (in cooperation with input from Central Control 10) could be used to control the calling to cellular radios 20. The third party could also obtain proprietary area codes, CTO numbers, and phone IDs unavailable to other persons  
15 or companies. This would ensure that no accidental or intentional but unauthorized caller could send calls in the system of the invention.

The third party would effectively function like an MTSO, but have a proprietary control office for  
20 the cell phones in the system. By appropriate controls and software, the third party could restrict any outgoing calls in case an MIN and/or MIN/ESN is poached.

Furthermore, the third party could send  
25 cancellation messages after a certain time for each

paging to free up space and capacity over the cellular control channels.

Information could be sent to the third party from the Internet, any intranet, or land-line. This  
5 third party, called a "gateway" between Central Control and the regular cellular system, would essentially act as a "home" cellular system or MTSO for all cellular phones associated with the preferred embodiment. Therefore, all those cell  
10 phones would essentially be roaming the cellular intersystem network. The gateway would place a "call" to a roamer cell phone via its special MTSO programmed to accept the special MIN's.

An example of such a third party gateway is  
15 Cellemetry of Atlanta, Georgia. In their system, the MTSO can be programmed with up to ten MIN's per cellular radio. Higher numbers of MIN's per phone are possible.

Figures 13-15 show how the gateway system could  
20 be accessed by Central Control, and how scheduling and other relevant information can be provided from Central Control 10 to gateway 22 via a private , secure location in the gateway website.

## Remote Equipment Controller or REC

In this embodiment, communications hardware, software, and networks have been described which allow Central Control to use the quick, low cost control channels of the AMPS cellular telephone protocol to contact a plurality of remote cell phones using existing infrastructure. Use of this communication to affect a function at a remote lighting system 12 involves utilization of a remote equipment controller or REC 14, which will now be described in more detail.

By referring to Figures 8 and 9, the REC 14 can be seen in one form. For lighting systems, particularly outdoor systems, REC 14 can be contained in a lighting contractor cabinet or an LCC 48 (e.g. NEMA 4X enclosure-fiberglass (indoor) or aluminum (outdoor), 16" (H) x 14" (W) x 6.25" (D)), fully assembled and factory tested. The LCC could be separate.

Major components of REC 14, in addition to cellular radio 20, include controller 50 (e.g. a PLC), relay board 52 and power supply 56. The contactors and fuses/breakers could be in the LCC. Relevant characteristics of these components are set forth below.

Controller 50 can be a 87C52 from Intel Corporation. It includes non-volatile memory into which a database is pre-programmed. Authorized MIN's for radio 20 are mapped to instructions in the database. The instructions are then carried out by PLC 50 by sending electrical instructions to other component(s) of REC 14. When a call is made to REC 14 using a MIN to which REC 14 responds, controller 50 (via appropriate connection to radio 20) is given the authorized MIN and thus can map the MIN to its stored instruction set for that REC 14. Non-volatile memory retains information even in power outages or brown-outs.

Multiple (e.g. eight) output relays are used on relay board 52 to control electrical loads such as conventional lighting contactors .

Multiple lighting contactors 54 (e.g. six Siemens Sirius 3R series individual Form C contacts, hermetically sealed maximum 7.5 amp at 120 VAC)) are controlled by the relays of board 52. By this method, the very high voltage/current needed by the high-powered lights (e.g. 1500 Watt Metal Halide lamps), can be turned off or on by much lower voltages/currents.

Optionally, multiple (e.g. eight) three-position selector switches (Off-On-Auto or OOA,

Make-Before-Break or MBB) could be included in REC 14 or LCC or a separate enclosure for convenient access. They could be door mounted, with one red pilot light for each OOA switch. The function of these switches will be discussed below.

Electrical power could be delivered through a duplex receptacle - 120 VAC (for field service tools). Primary and secondary fusing as well as terminal blocks could be used for this incoming power, load wiring and REC control. The input power supply (e.g. 115 VAC (+/- 10%)) can have replaceable fuse and transient protection. All internal devices are widely available. Some could be DIN rail mounted for easy replacement. Approvals and standards include UL 916--energy management system for the REC, and FCC part 15 for a Class A device.

REC 14 includes separate line voltage Off-On-Auto switches (OOA) for each control circuit. New installations are pre-engineered and factory assembled which includes all necessary contactors, OOA switches and control transformer, fuse blocks, and terminal strips. REC 14 allows manual control of high voltage 3 phase sports lighting or automatic control from the REC.

REC 14 could include a short mast, noise free, high impact durable antenna (when unit is mounted outside) or a standard whip antenna for inside.

Optionally an internal heater with regulating thermostat could be factory installed (recommended where outside temperature drops below 15 degrees F.).

REC 14 can be pre-wired, fully tested wiring harness between relays and lighting contactors. Plug-in screw terminals accommodate up to No. 14 AWG wire . It can have snap-in electronic circuit boards with built in test buttons to verify operation ability to test the unit with a direct page or by a portable computer connected through a serial communication port.

#### **OPERATION**

The present system first requires input from the customer as to an on/off schedule for the customer's lights. As discussed previously, this information can come into Central Control 10 in a number of different ways and from almost anywhere. Figure 10 illustrates a schedule for the hypothetical Twin Peaks Park District of State A, City 1. Five different lighting zones are to be controlled, one being simply security lights. ON

and OFF times are formatted by the customer or Central Control 10 in a fashion that can be entered into the Central Control database.

Figure 11 illustrates some of the additional  
5 information that would be pre-programmed into that database. Details about the relays and contactors in the REC 14 for the lights in each lighting zone are pre-known and in the database. A default schedule could optionally be entered.

10 Central Control's computer therefore knows when to turn each lighting zone on and off. The customer sets the schedule.

Alternatively, the authorized customer can enter or change on/off times. A template such as  
15 Figure 10 or 11 could be used to enter a new ON/Off schedule or to review or modify a current schedule.

As shown in Figure 8, the user of the system can send information regarding instructions at a remote lighting facility via the Internet, e-mail, a  
20 cellular telephone call, or even a standard call. When this information is received at the central location, the user's request will be identified and matched to instructions contained in the PLC at the remote equipment controller. The instructions  
25 contained in the remote equipment controller can be



standard instructions or can be personalized through each user.

The central location will have a plurality of mobile identification numbers designated from a cellular carrier. This cellular carrier will have access to area codes outside of the common carrier accessibility. Therefore, a standard cellular or standard telephone could not be called using the system. Figure 3 details an exemplary hypothetical list of possible MIN numbers designated to the central location for a specific user.

The cellular telephone system has been split up into an "A" channel and a "B" channels. All receivers can listen to only one channel, A or B, at any given time. Also, a radio can respond to "even" or "odd" MINs but not both. Therefore, looking at Figure 3 the representation of 080-377-4000 ("even" MIN) would represent the same function as 080-377-4001 ("odd" MIN). They are mapped to the same function.

By referring to Figure 12, most MIN's are assigned from a cellular provider a plurality of mobile identification numbers to achieve a plurality of functions. The cellular provider will have access to area codes not accessible to common carriers. These assigned mobile identification

numbers can range from a plurality of last four digits in an area code to a plurality of office codes and available last four digits inside those codes.

5           PLC 50 can be pre-programmed with desired functions. PLC 50 contains the memory map where the functions are stored. Each memory location inside the memory map directly maps to a respective MIN number. By referring to Figure 12, a remote  
10 equipment controller (REC 14) or wireless remote lighting controller receives the MIN from the cellular provider. REC 14 is normally collocated with the lighting system.

          Referring to Figure 8, Control Central receives  
15 information via the Internet or telephone from the customer location. This information is then translated to a respective function or MIN number and transferred to the cellular provider.

          Central Control 10 places a call which goes to  
20 that carrier's computer (MTSO). It checks where the remote radio 20 is (if in its "HOME" area, the carrier's computer knows because of registration process). If radio 20 is in a "VISITING" area, the intracellular network finds and then knows where it  
25 is at. The carrier sends a MIN to the location of a

nearby antenna, which broadcasts the MIN and rings  
radio 20.

Once the mobile identification number for the  
specific function chosen by the user has been  
5 obtained, the number is then sent to the cellular  
provider that has assigned the MIN's to the central  
location office. Referring to Figure 8, the  
cellular provider then sends this information to  
either a satellite (or an antenna, through broadcast  
10 or hardwire), inside of the cell where the remote  
equipment controller is located. The MIN is then  
sent to the phone via the control channel of  
standard cellular telephone usage.

A control channel only carries data. By using  
15 the control channel there is no interference with  
the voice channel.

Radio 20 essentially listens for its number and  
acts according to logic at REC 14. REC 14 receives  
and stores messages. It looks at the MIN received  
20 at radio 20, in the form "abc-def-wxyz", where abc =  
area code (proprietary to gateway so no one else can  
interface with the functioning of these  
communications), def = CTO number, wxyz = w000 to  
w999; giving possibly up to 1000 instructions. It  
25 automatically turns the lights on or off per user

schedule. It is thus remotely controlled by a cellular signal.

Referring to Figure 9, when the remote equipment controller receives the MIN via cellular radio 20, the remote equipment controller will decode the last three digits of the MIN. The PLC will then take these three digits and memory map them to a location containing the function desired to be performed at the remote lighting system. When that function has been found, the PLC then sends confirmation back to Central Control and the function is performed.

Looking at Figures 12 and 13, there is a possibility for a plurality of functions. In the example of Figure 3 there could be hundreds of functions. There may be more in the future.

Thus, by this method the schedule for each lighting system is automatically accomplished by Central Control sending out pages through the control channels of the cellular phone network to appropriate REC's at appropriate times.

The primary MIN "wakes up" radio 20, or in other words, lets radio 20 know that an instruction will follow shortly (within a pre-selected time—e.g. 60 seconds). The gateway codes a plurality of what will be called "secondary MINs" to a plurality of functions to be

carried out by REC 14, and stores those secondary MINs in the gateway database. The gateway continuously scans (e.g. every minute) the schedules in the database.

Whenever the schedule for a particular zone of lights indicates that an action time approaches for that zone of lights, the gateway encodes a MIN based on the current state of the relays for the particular REC involved and then fires off that secondary MIN into the IS-41 signaling network [with appropriate routing so that it will be transported to the appropriate radio 20.

Radio 20 receives the secondary MIN, and passes all digits of the MIN to PLC 50. The pre-programmed map in PLC 50 decodes the last three digits xyz and generates the appropriate control signal to the appropriate relay(s) to either turn that zone of lights ON or OFF, depending on the schedule.

In practice, each relay is activated or deactivated by relatively low voltage but controls whether the high voltage needed by a bank of sports lights, for example, is supplied to the lights to turn them ON and operate them. Each individual relay or group of relays is controlled by one or more MINs; one set of MINs to turn the relay(s) ON; one set to turn the relay(s) OFF. Therefore, if the schedule requires that substantial sized area to be lit (i.e. which requires several banks or zones of lights to turn on), more than one relay must

be controlled at the scheduled time. Multiple MINs can not be sent to a single radio 20 in parallel; the gateway must send a "primary" MIN first, to "wake up" or "alert" radio 20 and then send a "secondary" MIN to perform a control function. The gateway waits for a predetermined time (e.g. approx. 60 seconds), and then sends another "wake up" primary MIN followed by a secondary MIN to perform other control or scheduling function, and so on until all necessary scheduling functions have been specified. The gateway must therefore initiate the whole procedure far enough ahead of the scheduled time for use of the field so that all lights are on at that time.

The gateway knows which radio 20 was just woken and knows which instruction it needs to send to that radio 20. Therefore, the secondary MINs do not have to be unique for each radio 20. This allows for many less proprietary MINs to be obtained (MIN reuse). It can also allow for a standard MIN set to be created regardless of what radio 20 is involved. The gateway locks any other message from going to a waken up radio 20 until either a secondary MIN is received and a confirmation is sent back or a set period of time expires (the radio "times out").

The back end software at the gateway essentially operates according to the following flow chart:

- 25 Scan database on request or every set amount of time.
- Look for schedules whose time is up for transmission.

Encode secondary MIN based on an action to be performed for each REC related to each schedule up for transmission.

Send Primary MIN to relevant radio to wake it up.

- 5 Follow Primary MIN with the encoded secondary MIN to the radios.

The gateway can use a UNIX or Windows NT based computer. The Webserver (e.g. Microsoft Internet Information Server or Apache) can run on Windows NT or  
10 Unix. The website of the gateway can be programmed in a combination of Java, HTML, Microsoft SQL, Delphi, and Perl languages. The database can be programmed in Microsoft SQL, Oracle, or Progress.

It is possible for feedback to be generated by the  
15 REC and sent back to the gateway. As discussed above, the reverse control channels have the advantage of carrying the 32 bit ESN as well as the MIN. By appropriate programming of radio 20 and PLC 50, the ESN can be masked and replaced with data. In the present  
20 embodiment, 8 bits are used to tell the gateway such things as (a) instruction received and executed or (b) instruction received but not understood. If radio 20 wakes up with the primary MIN but does not receive a secondary MIN within a set period of time, PLC 50 can  
25 execute a "time out" function on its own, and could

indicate this over the 8 bit message masked over a part  
of the ESN.

In any of the above cases, the gateway would receive  
and decipher the 32-bit return message from the REC. The  
5 gateway could then send a communication in any of a  
variety of forms to Central Control so that Central  
Control knows what occurred. Central Control in turn  
could communicate in any of a variety of ways with its  
customers.

10 Because of the 32 bits in the ESN, a return  
message to the gateway could include other  
information. Examples are: what the signal  
strength was of the received instruction, how many  
times radio 20 had to be paged before it sent a  
15 confirm back to the gateway, the identity of the  
switch that the antenna connected to, and status  
codes, such as whether the function was completed or  
not.

#### *OPTIONS, ALTERNATIVES, FEATURES*

20 The included preferred embodiment is given by  
way of example only, and not by way of limitation to  
the invention, which is solely described by the  
claims herein. Variations obvious to one skilled in  
the art will be included with the invention defined  
25 by the claims.



One option of the system is to confirm the carrying out of the schedules to the customer. As shown in Figure 3, a customer can be notified via email or fax that the schedule has been entered into Central Control and/or carried out at the customer's lighting systems.

Some other options are as follows. There may be times where the lights need to be turned on or off outside the established schedule in the database at Central Control. For example, there may be a need to turn lights ON early (for a pre-game test or unscheduled event) or keep lights ON longer (if a game is running later than planned) or turn lights OFF early (game canceled or cut short, bad weather).

One override method one is a telephone override. It works in this manner: customer will call a toll-free number and speak with a Control Central staff person. That person will validate the customer's PIN against the central database and enter the requested changes on the customer's behalf. In the case of trying to extend the ON time, users need to call at least 15 minutes before scheduled OFF time to ensure that the new messages will be received by the REC 14 before the automatic OFF time. Another override method two involves the use of the Off/On/Auto (OOA) switches previously

described. Each REC will have individual OOA switches for each control zone. The REC will operate automatically when the OOA is in the AUTO position. In the ON position the lights will remain ON until the OOA switch is changed to OFF or back to AUTO.

Another option is to assign more than one MIN to a cell radio 20. One line (the first MIN) is rung, then the calling phone hangs up. The PLC could go into wait loop where stop and listen (the PLC is alerted). If a call is received on any of other nine lines (e.g. nine) within a period of seconds (e.g. 30) then PLC 50 knows to do function 1; if line 2, function 2; ...; if line 9, ....., function 8.

During a power failure, relays go to their default state (i.e. NO or NC). After normal power returns, the REC unit will auto-restart and resume normal operation. PLC 50 remembers the last state and schedule of the relays prior to power loss and restores them to the appropriate state upon resumption of power.

The simplest use of the system according to the preferred embodiment, is to simply initiate the cellular page to remote radio 20. The PLC associated with that radio 20 reads the MIN that is

attempted to be paged by Central Control 10, and in particular, reads the last three digits of the MIN. Once the page is decoded, the PLC simply turns the lights on or off.

5       As is known in the art, if there is a need to send data back to Central Control from the REC, one might be able to use the 32 bit ESN in reverse control channel communications from radio to control central. This would allow up to 32 bits of  
10 information to be sent back for remote monitoring and status information. The ESN could be "masked out" by the gateway company. It can also be reprogrammed on the fly in the field.

Some examples of remote monitoring over the  
15 reverse control channel, as opposed to remote control over the forward control channel are as follows:

- a) Measurement
- b) Poll information
- 20 c) Monitor, use thresholds, if exceeded, let us know
- d) Alarm monitoring
- e) Security alarms
- f) On-demand status
- 25 g) Location/GPS
- h) Track mobile equipment

- i) Motion detectors or sensors
  - j) Can override PLC if game too long.
  - k) Can function as security device/alarm if notices activity during "off" hours
- 5
- l) Rain sensors
  - m) Photo detectors
  - n) Measure lamp life
  - o) Detects malfunction or light is out
  - p) Data gather lamp life, field usage, energy
- 10 usage

Areas and facilities that can use this device are:

- a) Park districts
- b) Schools
- 15 c) Ballfields
- d) Sports complexes
- e) Golf course
- f) Ski resorts
- g) Racetracks
- 20 h) Sportslighting
- i) Security
- j) Parking lots
- k) Door locks

25 One alternative embodiment to this, is that there would be a plurality of books of functions

inside the PLC. The first call to the remote equipment controller would identify which book the functions are located in and the next call would identify what function to use inside that book.

5       And yet another embodiment splits the clock inside the PLC into segments. Each segment would have up to 1,000 (000-999) functions. See Figure 13. By using this method the central location can greatly expand the amount of functions used in a  
10       limited MIN number range. Therefore, each MIN number would represent a different function depending on what time it was. Thus if a central location only had 500 MIN numbers, by splitting the clock into five segments the central location would  
15       have up to 2,500 functions available. In order to achieve this operation the clock(s) at the central location and the clock at the remote equipment controller would have to be synchronized to avoid error. Therefore, a command coming from the central  
20       location would have to synchronize the clocks at a time interval to stop the clocks from drifting.

Confirmation options. Multiple confirmations could be sent to customers, e.g.:

25       a) Schedule request received (e.g. via e-mail to end user from control central)

b) Action transmitted to gateway company (e.g. e-mail to end user)

c) Action was executed at REC.

5           The invention has been described in some detail as to the requirements for each aspect of the invention. Specific examples are now shown of a data representation of the time schedule and a command instruction set that could be used. The  
10 creation of a data representation of a time schedule and a command instruction can vary as is well known in the art and the data representations shown are by way of example and are in no way limiting.

#### Time Schedule

15           Figure 22 shows how the customer's schedule can be represented by a data structure or data format that reduces the amount of memory needed and the amount of data that needs to be communicated in a complete one week long time schedule. One method of  
20 doing so involves grouping the relays into groups. For example, a group size of 8 relays can be selected. A number of groups can be determined, such as 10 groups. For each group, a number of events can be assigned for a given time period  
25 during which the events are to occur. Turning on the lights and turning off the lights are examples

of events. In one embodiment, four events can occur in a day. This would, for example, permit one or more groups of relays to turn on and then off and then on and then off in a single day. To decrease the amount of storage required for a time slot while still permitting small enough time divisions such that lights can be efficiently controlled, 96 time slots per day can be used. This permits 15 minute wide time slots each day.

When only two types of events are used (i.e. ON and OFF), these events can be represented by a single bit. When 96 time slots are used these time slots can be represented with 7 bits. Because 7 bits permits 128 different discrete values there will be additional space. One use of this additional space is to add time slots for sunrise and sunset.

The table below also summarizes the space allocation required for a one week long schedule.

	<i>Space required</i>
Event	8 bits (1 byte)
	7 bits for time slot
	1 bit for ON/OFF
Day	4 bytes
	4 events of 1 byte

Group (1-8 relays per group) 28 bytes  
   7 days of 4 bytes  
 Schedule 280 bytes  
   10 groups of 28 bytes

#### Command set

Three digits are available for commands. Each digit can be represented in a binary coded decimal (BCD) notation. . A cellular radio can only hear transmissions that have "even" numbers or "odd" numbers. One bit of this last digit (least significant bit) indicates if the number is even (bit=0) or odd (bit=1). Therefore, this bit can not be used for command or data information, reducing the number of possible commands by two. For example, if a command to turn all groups on is given, this command could be communicated to either of two cellular radios in any given area.

Therefore two 3-digit commands, differing by the least significant bit of the least significant digit are needed to ensure that the same command will be issued regardless of which type of radio happens to be as the recipient of that call. For example, in one embodiment the three digit command of 500 could be the command to turn off all lights for one cellular radio and then, correspondingly, the command 501 (500 and 501 differ by the least



significant bit) would be needed to have the same effect to provide the same operation for a different radio.

The following table summarizes the 3 digit commands that are available in the forward channel direction. Note that some commands require more than a single page in order to implement. Where multiple pages are necessary, the number is specified. In addition, there is a corresponding registration response from the REC. This registration response can be one or more registration messages. Each registration message can be a verification of the information sent in the forward channel direction, or else each registration message can contain data. There may be multiple verification messages or multiple data messages or both.

3-Digit Command No. (Decimal) Even, Odd	Command Name	No. of Forward Channel Pages	Registration Response No. + Type
0X0, 0X1	Turn Group X Off at Time in Bin 1	1	1 - Verification
0X2, 0X3	Turn Group X	1	1 - Verification

	Off at Time in Bin 2		
0X4, 0X5	Turn Group X Off at Time in Bin 3	1	1 - Verification
0X6, 0X7	Turn Group X Off at Time in Bin 4	1	1 - Verification
0X8, 0X9	Turn Group X Off at Time in Bin 5	1	1 - Verification
1X0, 1X1	Turn Group X Off at Time in Bin 6	1	1 - Verification
1X2, 1X3	Turn Group X Off at Time in Bin 7	1	1 - Verification
1X4, 1X5	Turn Group X Off at Time in Bin 8	1	1 - Verification
1X6, 1X7	Turn Group X Off at Time in Bin 9	1	1 - Verification
1X8, 1X9	Turn Group X Off at Time in Bin 10	1	1 - Verification
2X0, 2X1	Turn Group X Off at Time in	1	1 - Verification

	Bin 11		
2X2, 2X3	Turn Group X Off at Time in Bin 12	1	1 - Verification
2X4, 2X5	Turn Group X Off at Time in Bin 13	1	1 - Verification
2X6, 2X7	Turn Group X Off at Time in Bin 14	1	1 - Verification
2X8, 2X9	Turn Group X Off at Time in Bin 15	1	1 - Verification
3X0, 3X1	Turn Group X Off at Time in Bin 16	1	1 - Verification
3X2, 3X3	Turn Group X Off at Time in Bin 17	1	1 - Verification
3X4, 3X5	Turn Group X Off at Time in Bin 18	1	1 - Verification
3X6, 3X7	Turn Group X Off at Time in Bin 19	1	1 - Verification
3X8, 3X9	Turn Group X Off at Time in Bin 20	1	1 - Verification

4X0, 4X1	Clear Schedules Group X	1	1 - Verification
4X2, 4X3	Turn Group X ON Now	1	1 - Verification
4X4, 4X5	Turn Group X Off Now	1	1 - Verification
500, 501	Turn All Groups ON	1	1 - Verification
502, 503	Turn All Groups OFF	1	1 - Verification
504, 505	Set Day of Month for Reporting	2	1 - Verification
508, 509	Initiate Time Schedule	1	1 - Verification
510, 511	Reset Alarms	2	1 - Verification + Data
512, 513	Reset Controller	1	none
520, 521	Read Real-time Clock	1	2 - Verification + Data
522, 523	Set Real-time Clock (YY/MM/DD)	2	1 - Verification
524, 525	Set Real-time Clock (Hours & DST)	2	1 - Verification
526, 527	Set Real-time	2	1 - Verification

	Clock (Minutes)		
530, 531	Read Astronomic Data	1	2 - Verification + Data
532, 533	Set Astronomic Data (Latitude)	2	1 - Verification
534, 535	Set Astronomic Data (Longitude)	2	1 - Verification
536, 537	Set Astronomic Data (Sunset, Sunrise, GMT)	2	1 - Verification
540, 541	Get Radio Status	1	1 - Verification
544, 545	Suspend Radio from Service	1	1 - Verification
546, 547	Restore Radio to Service	1	1 - Verification
548, 549	Get Radio Registration Pass/Fail Count	1	1 - Verification + Data
550, 551	Get Switching Status	1	1 - Verification + Data
552, 553	Get System Port Status	1	1 - Verification + Data
554, 555	Run Diagnostic/Get Status	1	1 - Verification + Data

556, 557	Get DAU Current Mismatch	1	1-3 - Verification + Data
558, 559	Get DAU 1-6 Alarm Status	1	1-6 Verification + Data
560, 561	Set Group Occupant Warn Enable/Disable	2	1 - Verification
562, 563	Test Occupant Warn Output	2	1 - Verification
564, 565	Enable/Disable Motion Sensors	2	1 - Verification
566, 567	Enable/Disable Miscellaneous Flags	2	1 - Verification
570, 571	Set Remote Switches 5-8 to Group X	2	1 - Verification
572, 573	Set Remote Switches 1-4 to Group X	2	1 - Verification
574, 575	Set Relays 5-8 to Group X	2	1 - Verification
576, 577	Set Relays 1-4 to Group X	2	1 - Verification
580, 581	Get Channel 1-8 StartsTotalizat ion	1	4 - Verification + Data
582, 583	Get Channel 1-8	1	8 - Verification

	Manual Mode Totalization		+ Data
584, 585	Get Channel 1-8 Auto Mode Totalization	1	8 - Verification + Data
586, 587	Get Relay 1-8 State + Reason Code	1	3 - Verification + Data
590, 591	Get REC Alarm Status	1	2 - Verification + Data
6XX, 7XX, 8XX, 9XX	Time Schedule Event Change	2	1 - Verification

Message

Figure 23 shows a generic form of a command of a FOCC address page, a FOCC data page, a second FOCC data page and a registration response. A checksum is included in the verification to provide for error detection.

The checksum is the decimal sum of the last three digits of the address page added to the last three digits of the command page added to the last three digits of data page represented as an eight bit value. The result is then converted to a One's Complement and kept as a single 8-bit value.

It is to be understood that there may be one or multiple data pages in the FOCC direction and that

there may be one or multiple data pages in the registration response. This use for communicating data in the RECC direction is known in the art.



What is claimed:

1.

An apparatus for controlling remote devices comprising:

- 5 a central device including a database of events;  
a remote device connected to a resistive or inductive  
electrical load;  
a communications link adapted to communicate data from  
the central device to the remote device related to  
10 an event.

2.

The apparatus of claim 1 wherein the database comprises a schedule of events.

3.

- 15 The apparatus of claim 2 wherein the schedule of events is related to operation of the resistive or inductive electrical load.

4.

- The apparatus of claim 1 wherein the central device  
20 is a computer or network of computers.

5.

The apparatus of claim 1 wherein the remote device comprises a digital controller.

6.

- 25 The apparatus of claim 1 wherein the resistive or inductive electrical load comprises a lighting device.

7.

The apparatus of claim 6 wherein the lighting device comprises a wide-area lighting device.

8.

5 The apparatus of claim 7 wherein the wide-area lighting device comprises sports lighting or security lighting.

9.

10 The apparatus of claim 1 wherein the communications link comprises a wide-area communications link.

10.

The apparatus of claim 9 wherein the communications link comprises a wide-area network.

11.

15 The apparatus of claim 1 wherein at least a portion of the communications link is wireless.

12.

The apparatus of claim 11 wherein said wireless portion comprises cellular communication.

20

13.

The apparatus of claim 12 wherein the remote device includes a cellular receiver.

14.

25 The apparatus of claim 1 wherein said data comprises instructions.

15.

The apparatus of claim 14 wherein said instructions include one or more of the set comprising turn on, turn off.

16.

The apparatus of claim 15 wherein said instructions corresponds to a schedule related to time and/or date.

5

17.

The apparatus of claim 1 wherein said communication link is adapted to communicate data from the remote device to the control device.

10

18.

The apparatus of claim 17 wherein said data from the remote device to the control device comprises information.

19.

15 The apparatus of claim 18 wherein said information is related to one or more of the set comprising status related to the resistive or electrical load, and status related to a condition at the location of the resistive or inductive electrical load.

20

20.

The apparatus of claim 1 further comprising a plurality of remote devices, the communications link adapted to communicate data from the central device to the remote devices.

25

21.

The apparatus of claim 1 further comprising a component to revise said database.

22.

The apparatus of claim 21 wherein said component to revise said database comprises a data entry device connected to central device.

5

23.

The apparatus of claim 21 wherein component to revise said database comprises a remote communications device connected to said central device.

10

24.

The apparatus of claim 23 wherein said remote communications device comprises a device which can communicate data to the central device through a communication link.

15

25.

The apparatus of claim 24 wherein the communication link comprises one of the set comprising a wide-area network, and a telephone network.

20

26.

A method for control of remote devices comprising:  
storing in a first location information related to one or more events related to a resistive or inductive electrical load;  
communicating data related to an event from said first location to a second location related to said resistive or inductive electrical load;  
carrying out an action related to the resistive or inductive electrical load at the second location in response to said data.

25

27.

The method of claim 26 further comprising a plurality of resistive or inductive electrical loads positioned at second and other locations.

5

28.

The method of claim 26 wherein said second location is remote from said first location.

29.

10 The method of claim 26 wherein said stored information comprises a schedule of events related to the second location.

30.

15 The method of claim 26 wherein communication of said data is accomplished over a wide-area communications link.

31.

The method of claim 30 wherein the wide-area communications link is at least partly wireless.

20

32.

The method of claim 30 wherein the wireless part is cellular communication.

33.

25 The method of claim 32 wherein the data is communicated over a control channel of the part of the communication link that is cellular communication.

34.

The method of claim 33 wherein the data is contained within a part of a mobile identification number on the control channel.

5

35.

The method of claim 34 wherein the data comprises an instruction related to operation of the resistive or inductive electrical load.

10

36.

The method of claim 35 further comprising a database including an instruction set, the instruction set including individual instructions each communicatable over a unique mobile identification number to the second location.

15

37.

The method of claim 36 wherein a cellular receiver is positioned at the second location to receive the data in the form of a mobile identification number, said cellular receiver configured to respond to one or more mobile identification numbers.

20

38.

The method of claim 26 wherein the resistive or inductive electrical load is a lighting device.

25

39.

The method of claim 38 wherein the lighting device is a sports lighting device or security lighting device.

40.

The method of claim 39 wherein the sports lighting device comprises a plurality of sports lighting lights, each comprising a resistive or inductive electrical load.

5

41.

The method of claim 40 wherein the plurality of sports lights can be located at a second location or multiple locations.

42.

10 The method of claim 26 further comprising revising the stored information from time to time.

43.

The method of claim 26 further comprising communicating data from the second location to the first location.

15

44.

The method of claim 43 wherein the data from the second location to the first location comprise information regarding status of the resistive or inductive electrical load, or a condition related to the resistive or inductive electrical load or second location.

20

45.

A system for control of remote electric devices comprising:  
a central control including a computer, a memory in operative communication with the computer, and a database stored in said memory;

25

a set of remote controllers each operatively connected to one or more resistive or inductive electrical loads; a communications link adapted to communicate between said central control and said remote controllers.

5 46.

The system of claim 45 wherein said database comprises schedules related to operation of said resistive or inductive electrical loads.

47.

10 The system of claim 45 wherein said resistive or inductive electrical loads comprise lighting devices.

48.

The system of claim 45 wherein the lighting devices are sports lights or security lighting.

15 49.

The system of claim 45 wherein said communications link, at least in part, comprises a cellular network.

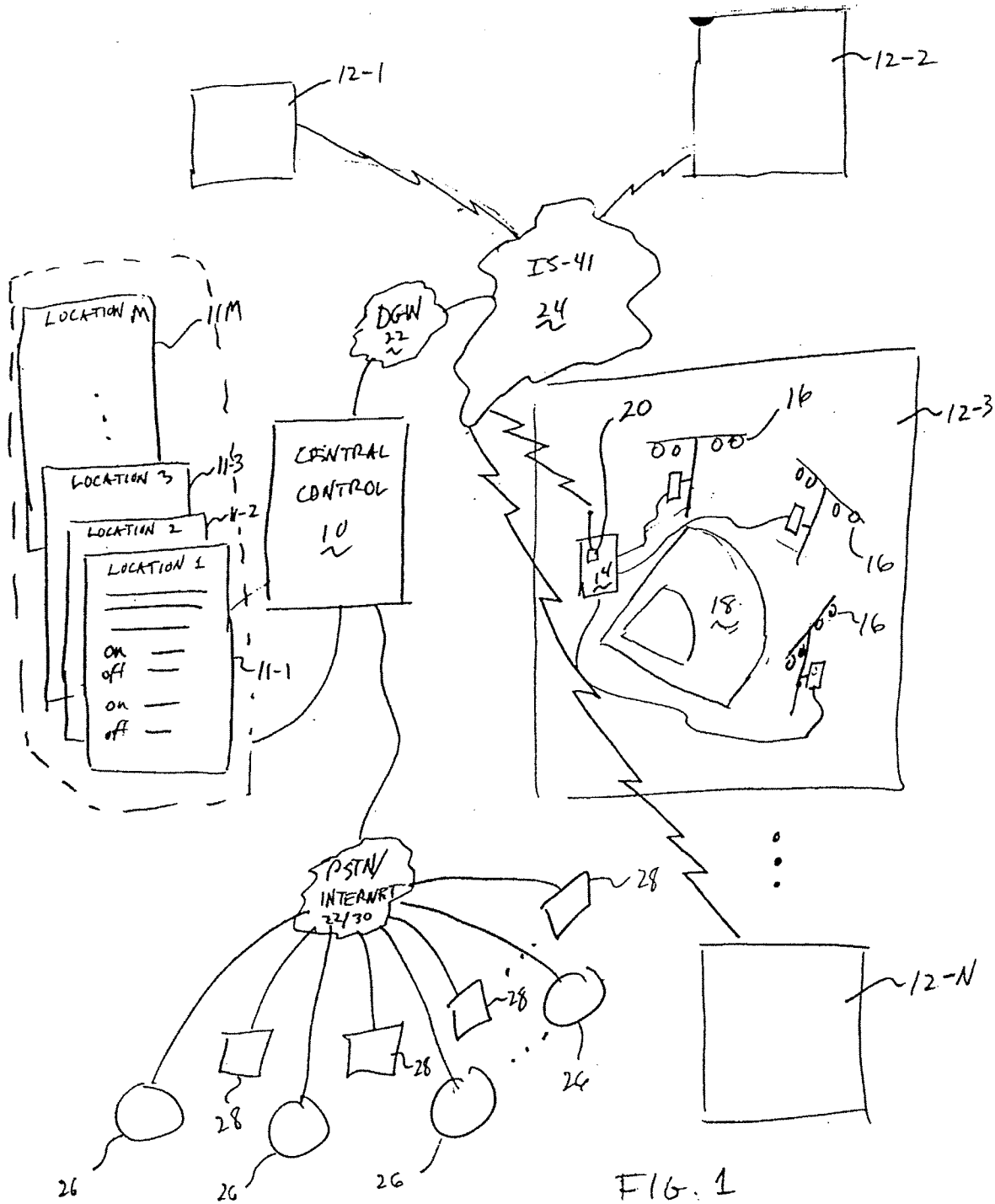
50.

20 The system of claim 49 wherein said communication link carries data over a control channel of cellular network.

51.

25 The system of claim 50 wherein said data relates to instructions regarding the operation of the resistive or inductive electrical loads.





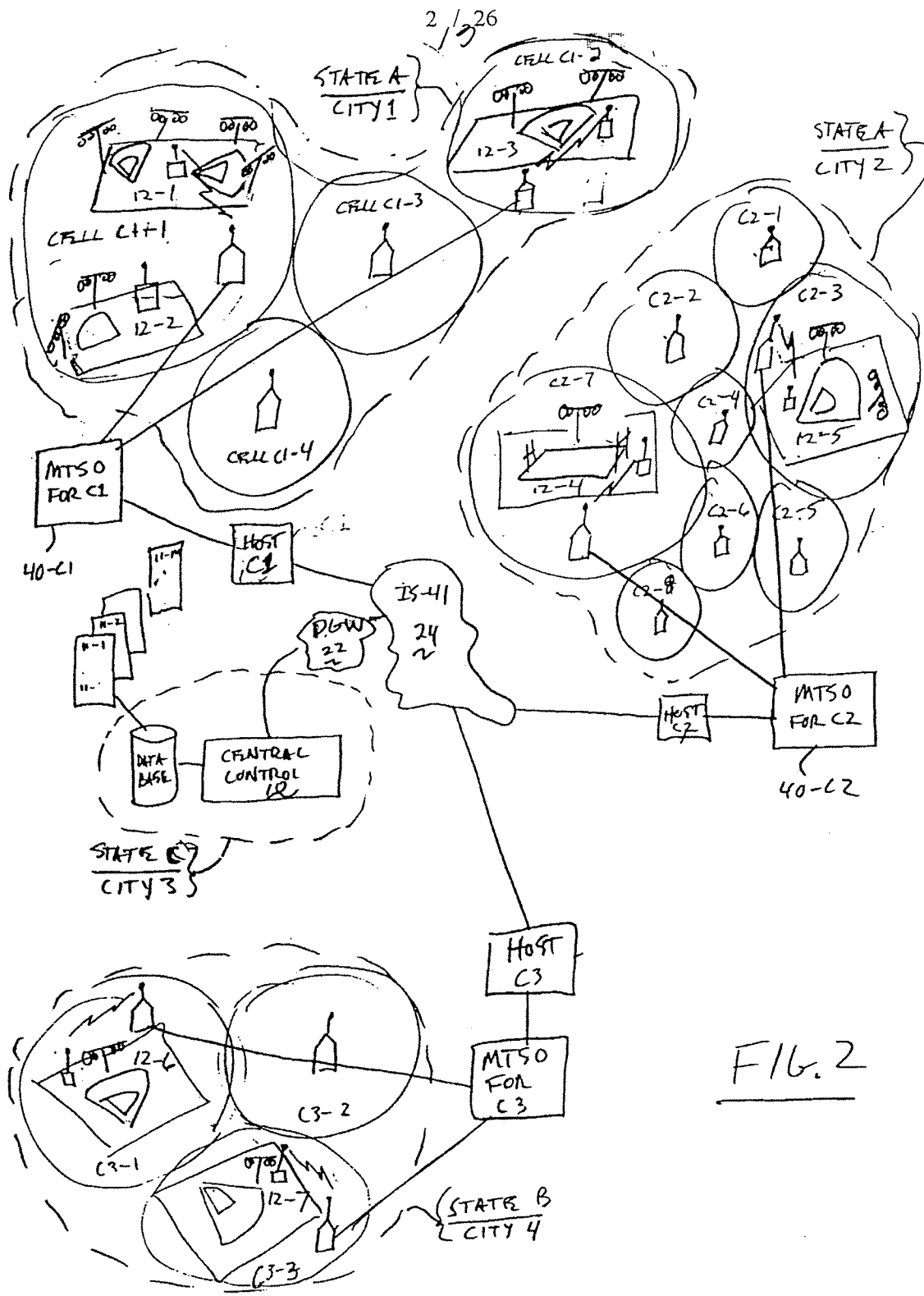


FIG. 2

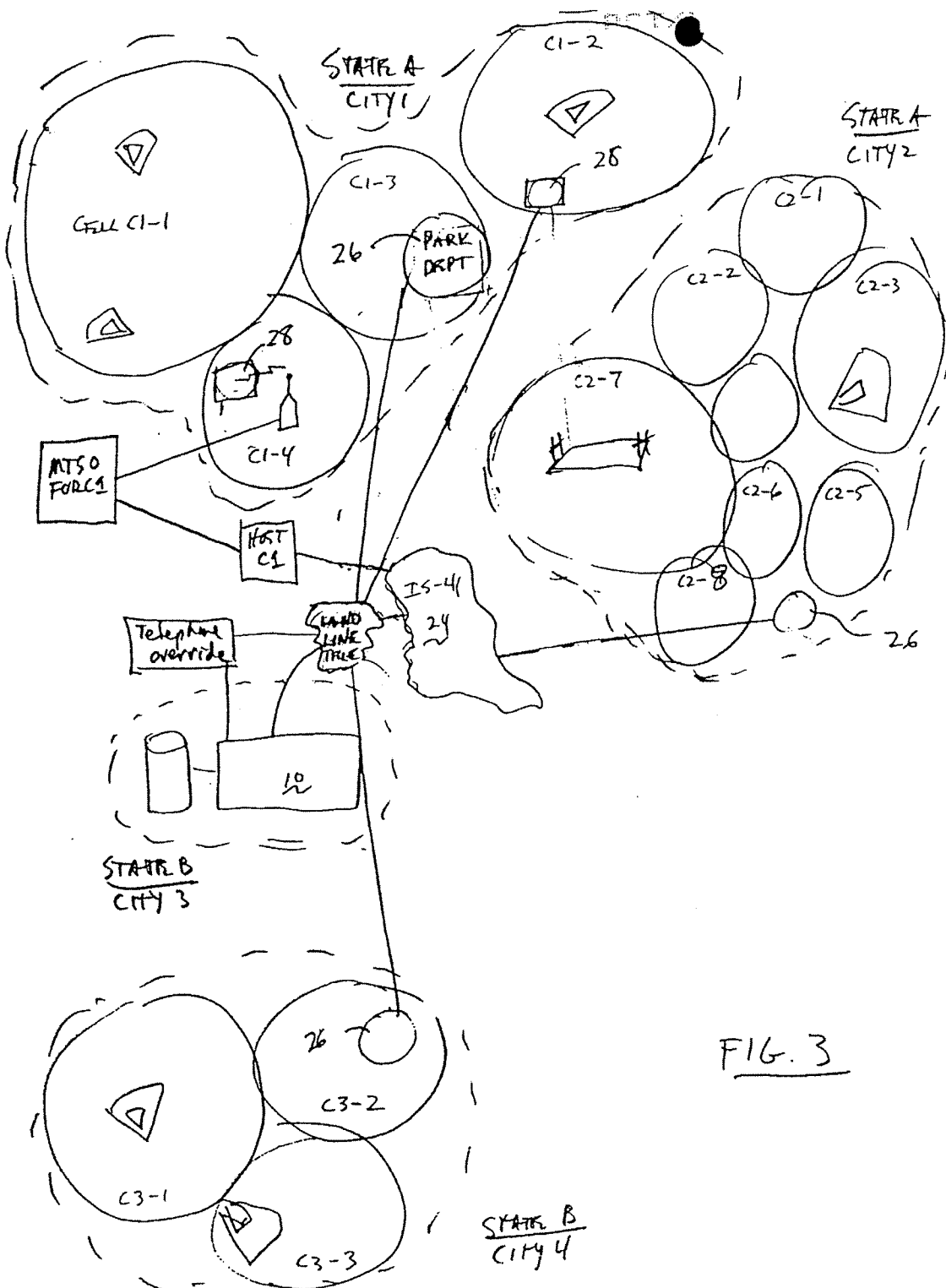
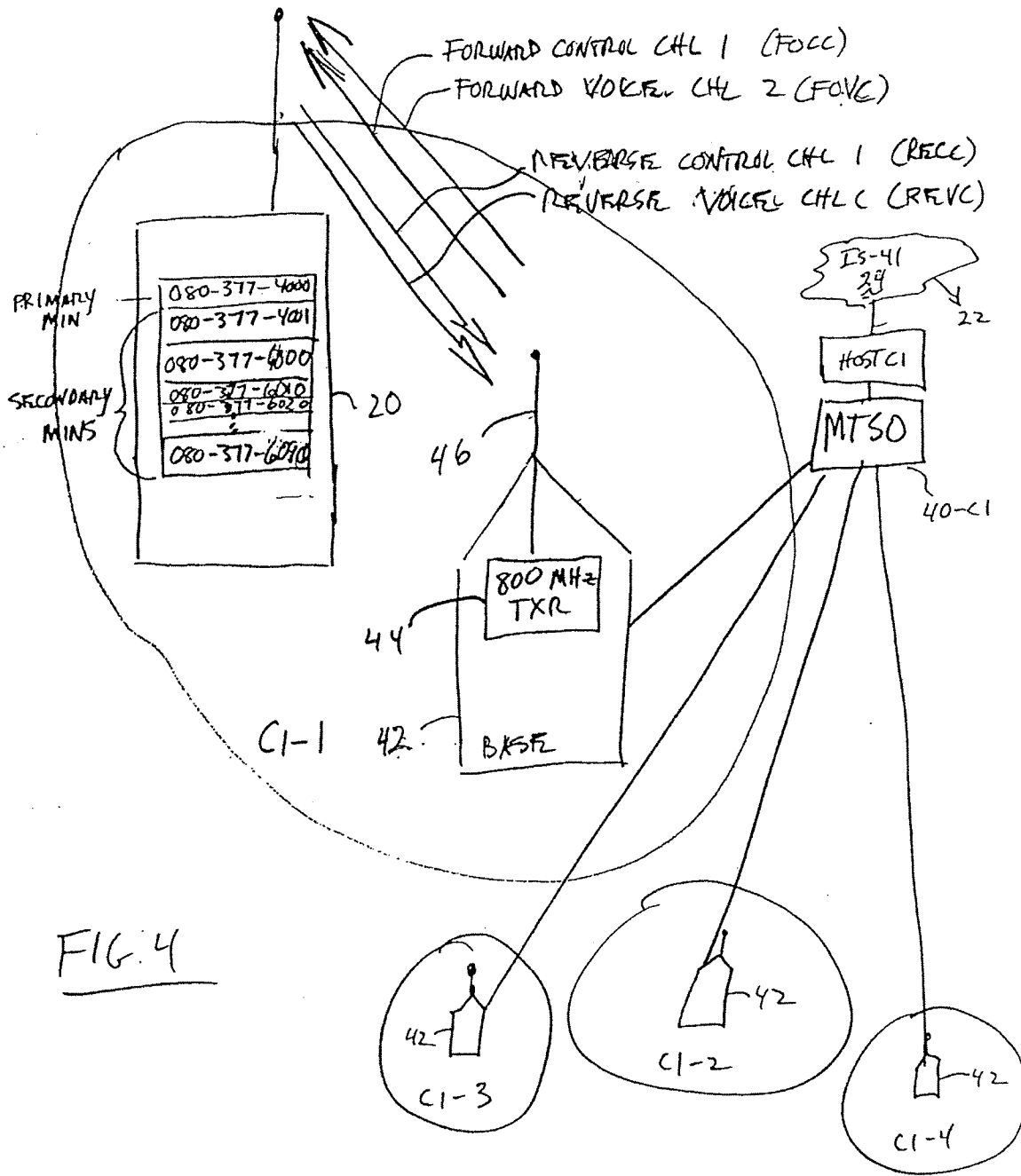


FIG. 3



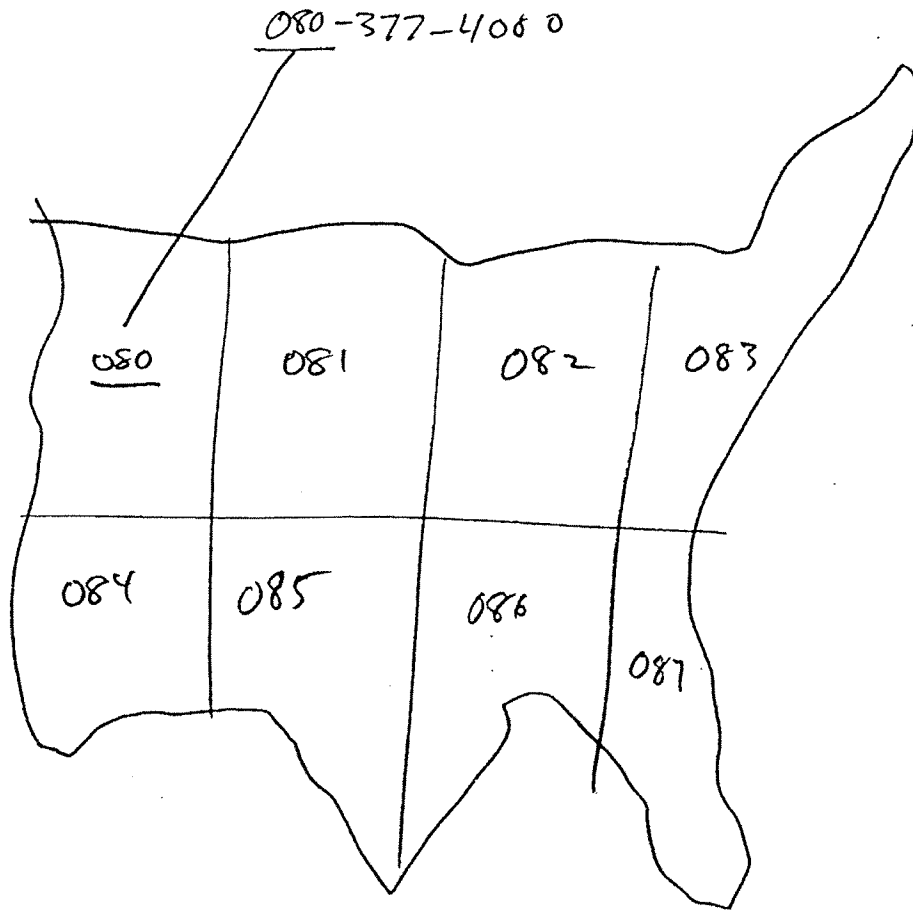


FIG. 5

080-377-4000

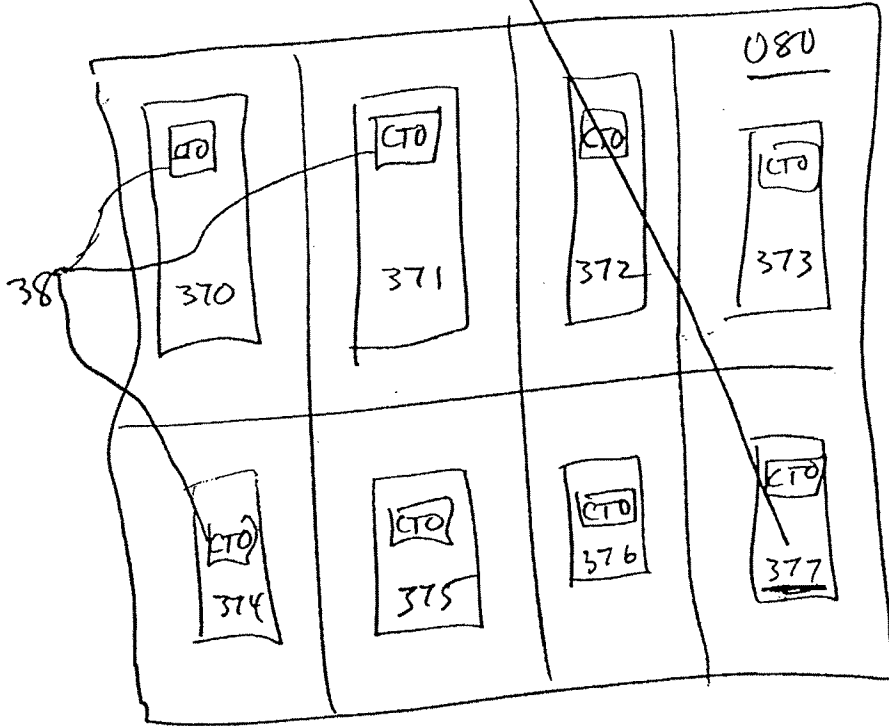


FIG. 6

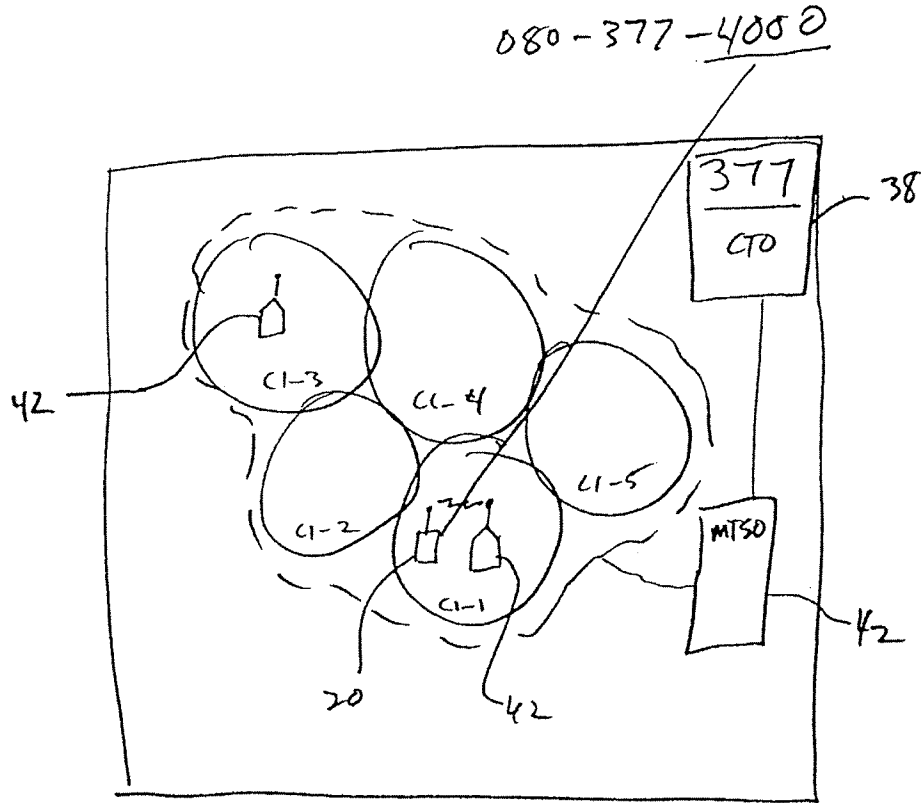
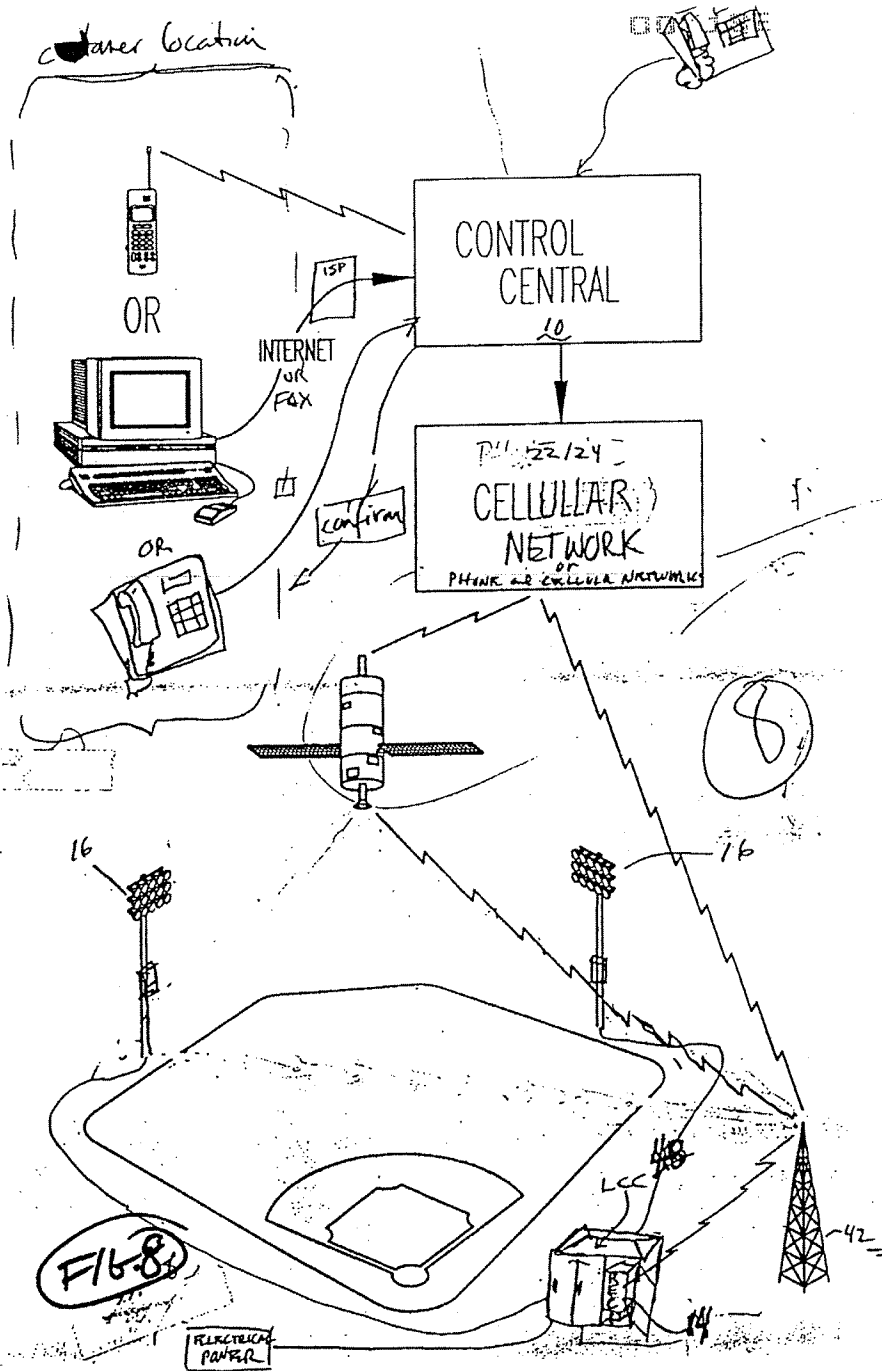
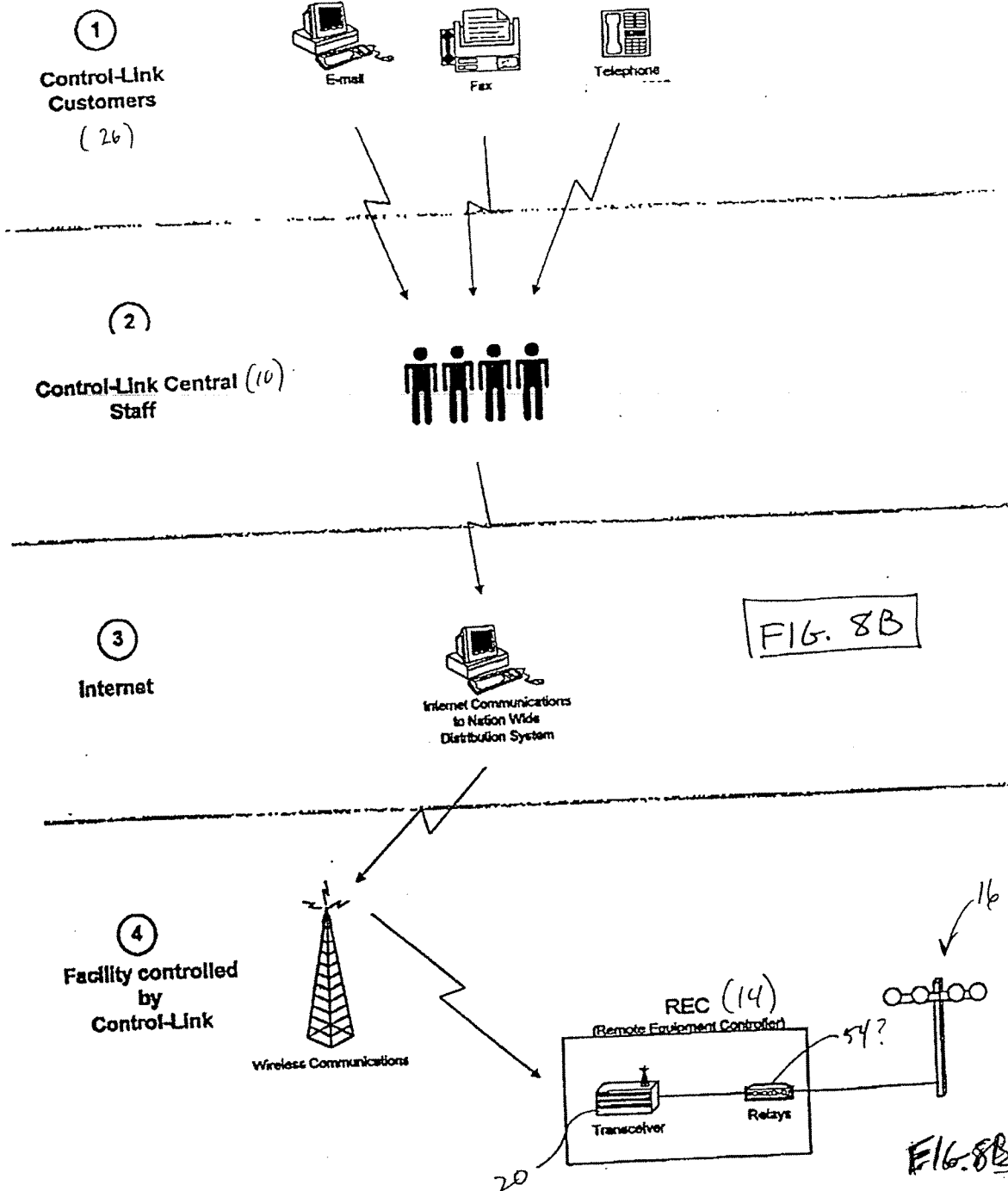


Fig. 7



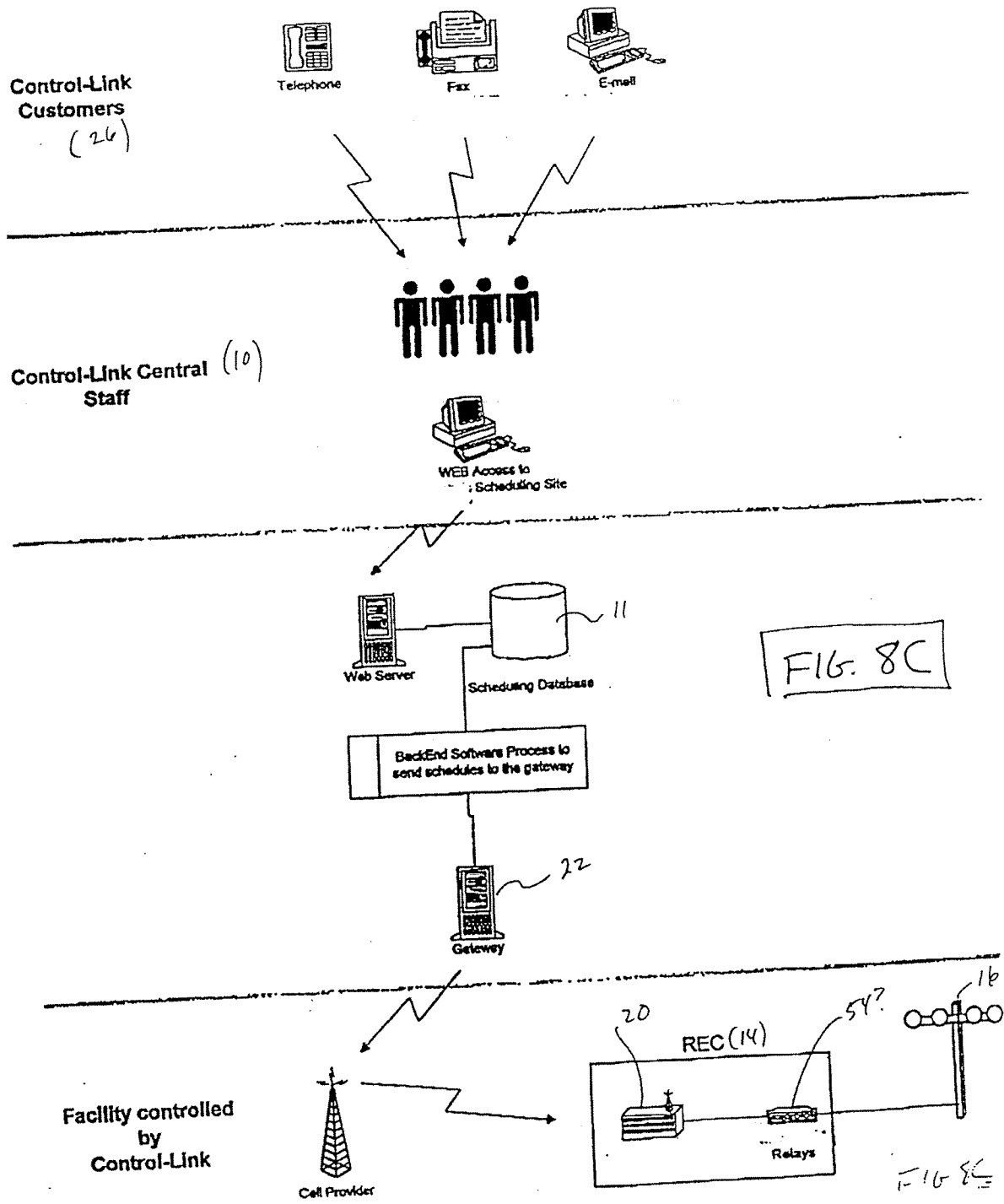


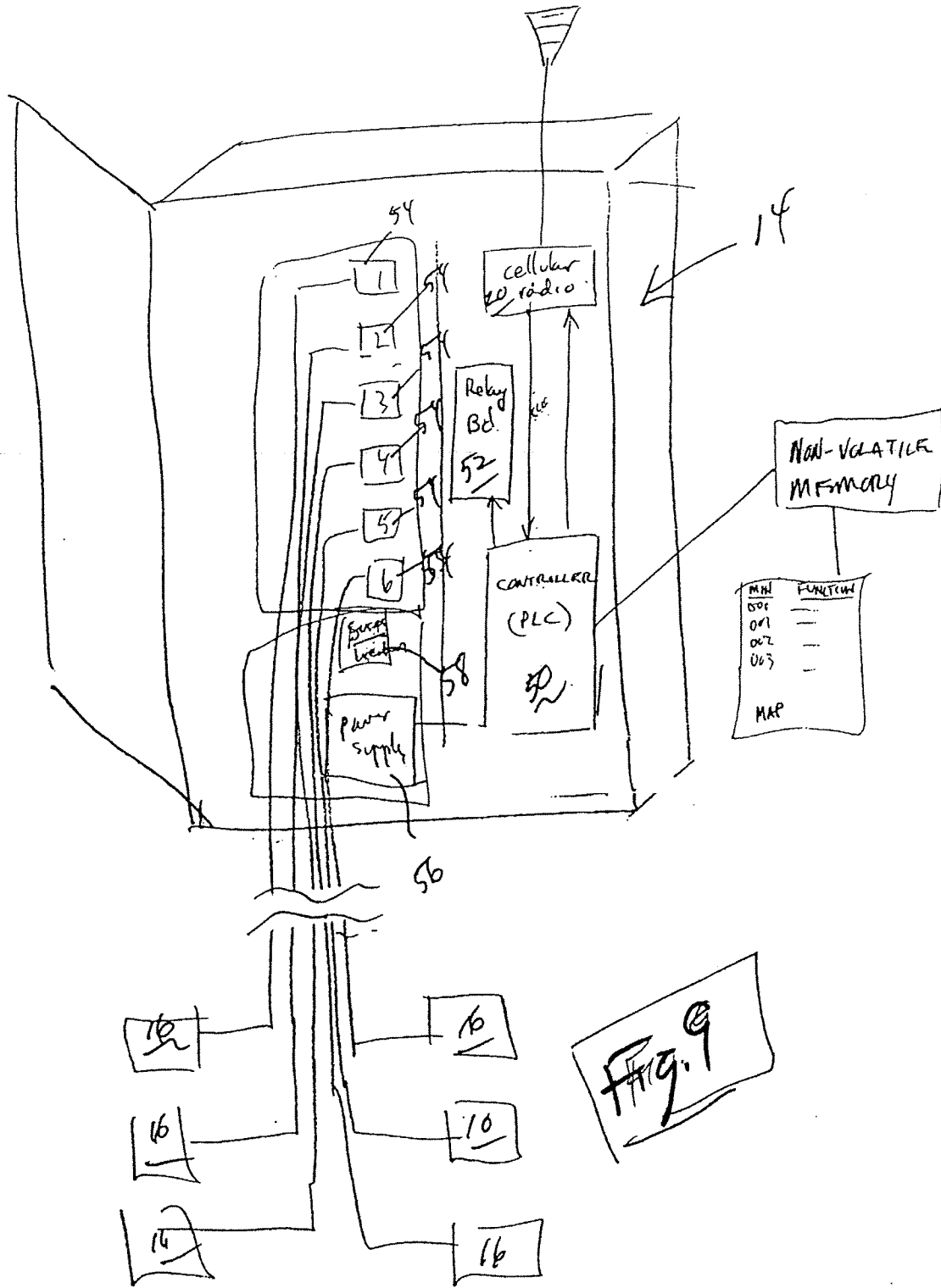
Control-Link Flow



Control-Link Flow Phase 1

PAGE 2





*Remote Equipment Controller (REC)*

- Completely assembled and tested
- Only 3 electronic assemblies
- Built-in diagnostics and test buttons

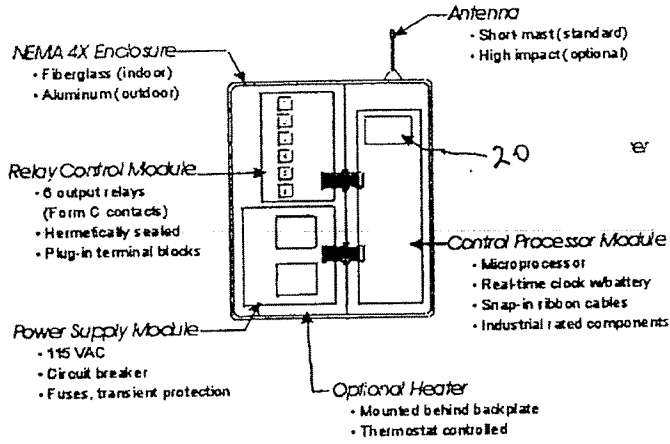


FIG. 9B

SCHEDULE

STATE A, CITY 1

Location: Twin Peaks Park

<u>Lighting Zone</u>	<u>ON Time</u>	<u>OFF Time</u>
Softball infield	18:00	22:30
Softball outfield	18:15	22:15
Soccer field	17:00	21:00
Security Lights	19:00	6:00

FIGURE 10

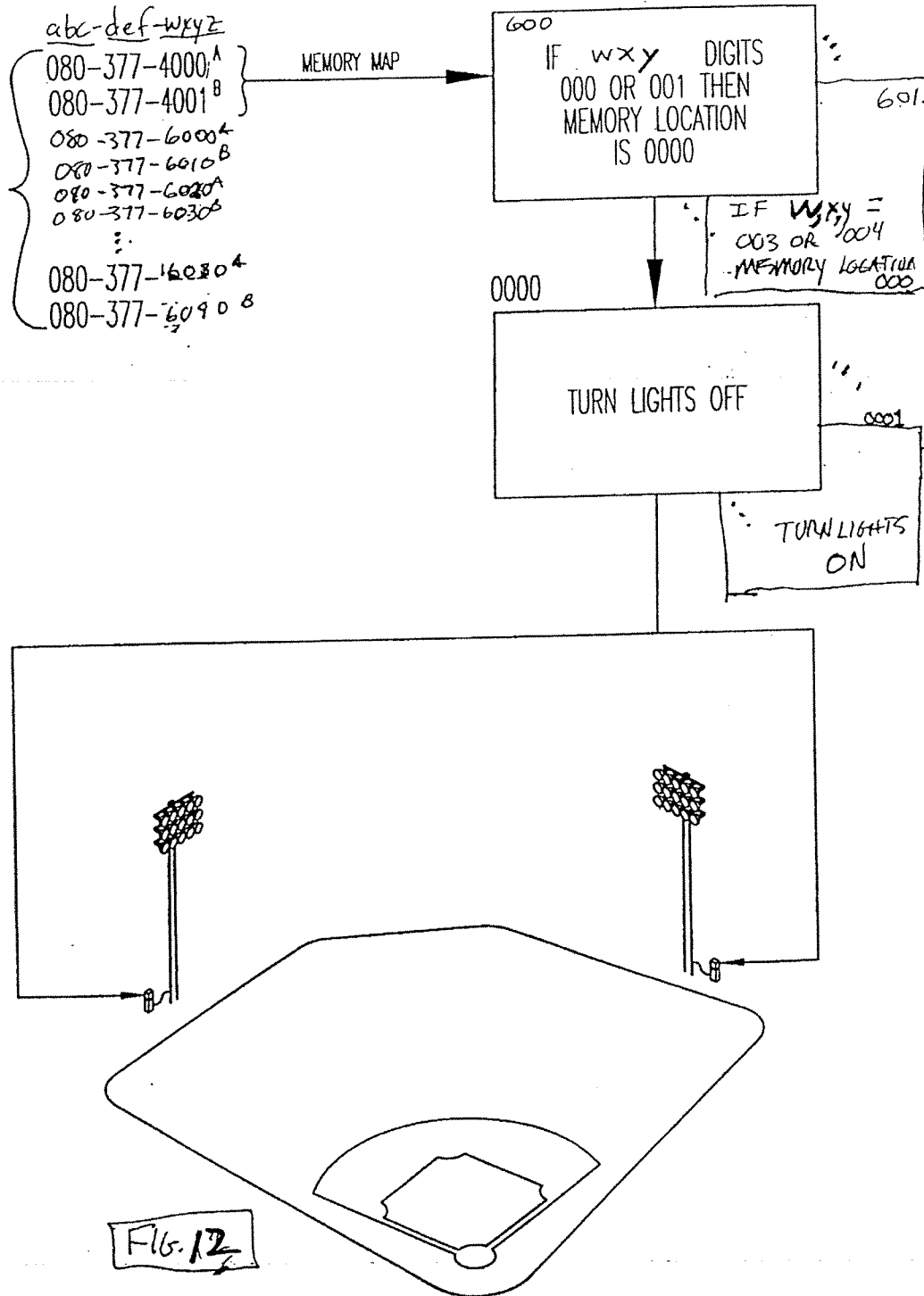
REC WIRING DATA

LOCATION (FIELD, BALLPARK): \_\_\_\_\_

REMOTE EQUIPMENT CONTROLLER: \_\_\_\_\_

RELAY	CONTROL ZONE	POLES	CONT	ACTORS	DEFAULT STATE
1					
2					
3					
4					
5					
6					

FIGURE 11



# Login

Application ID	<input type="text"/>
Password	<input type="text"/>
<input type="button" value="Login"/>	

FIG. 13



# Menu

- New Login
- Activate New Unit
- Deactivate Unit
- Subscriber Data
- Notification Strategies
- ESN Data Decoding
- Unit Configuration
- View Unit Registrations
- View Unit Notifications
- Program Unit
- Output Control
- 1601-SAC Docs



FIG. 14

# Output Control

Manu: Unit Number 0061014000 Refresh

*MAN #*

Immediate Control Send

<input checked="" type="checkbox"/>	On	Output	1	2	3	4	5	6	7	8
<input type="checkbox"/>	Off	State	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Schedule: undefined undefined

Row#	Mnth	Day	Once	Hour	Min	MO	TU	WE	TH	FR	SA	SU	Op1	Op2	Op3	Op4	Op5	Op6	Op7	Op8
2 ✓			x	11	10	✓	✓	✓	x	✓	✓	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1 ✓			>	11	16	x	x	x	✓	x	x	x	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Insert Update Cancel

Click cell image to toggle setting. Click "Rec#" cell image to delete record.

*FIG. 15*



**MUSCO**Control-Link Scheduler

- Instructions: 1. Follow instructions 1-4 below.  
 2. When completed email this form to [schedule@musco.com](mailto:schedule@musco.com) or Fax to 800-~~826-7444~~<sup>7444</sup>  
 \* If you have any question or problems call Control-Link Central directly at 877-~~826-7444~~<sup>7444</sup>

Customer Name: **City of Bartlett**  
 Customer Number: **XYZ**  
 City & State: **Bartlett TN.**

1. Fill in Usercode, Password, and Facility.

Usercode:  [Required]  
 Password:  [Required]  
 Facility:  [Required]

2. If you would like your confirmation sent differently then indicated below, please let us know how you would like your confirmation sent, i.e. phone, email, or fax.  
 Send back confirmation of the schedule to:

3. Established Weekly Schedules. (These occur weekly by default)

Begins Week of:

Zone Required	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off

4. Fill in any Exception Scheduling needs which are different than your Fixed Schedule

Zone	Start Date	Start Time	End Date	End Time

Note: Lack of required information will delay the implementation of your schedule

F16.16

### Musco Light Zone Information Form

City: [REDACTED] State: [REDACTED]

Time Zone: [REDACTED]

DayLight Savings Time Y/N: [REDACTED]

Facility Name: [REDACTED]

Unit/REC Number: [REDACTED]

Relay 1 Description: [REDACTED]

Relay 2 Description: [REDACTED]

Relay 3 Description: [REDACTED]

Relay 4 Description: [REDACTED]

Relay 5 Description: [REDACTED]

Relay 6 Description: [REDACTED]

**Customer Light Zones:**

Description

Relays

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Schedule Information:**

FIG. 17

Customer Information Form

**Musco Control-Link Customer Information Form**

**Customer Information**

Name:

Address 1:

Address 2:

City:

State:

Zip:

Phone:

Fax:

**Main Contact Information**

Main Contact Name:

Day Phone:

Night Phone:

Cell Phone:

Pager:

FIG. 18

Facility Information Form

**Musco Control-Link Facility Information Form**

Customer Name:

Facility (Park) Name:

Address 1:

Address 2:

City:

State:

Zip:

Phone:

**Emergency Contact Information**

Emergency Contact Name:

Phone:

**Time Information:**

Time Zone:

Day Light Savings Time Y/N:

FIG. 19

Scheduler Information Form

**Musco Control-Link Scheduler Information Form**

Customer Name:

Scheduler Name:

Address 1:

Address 2:

City:

State:

Zip:

Phone:

Cell Phone:

Fax:

Email:

Pager:

UserCode:

Password:

Facilities (Parks) they are allowed to schedule:

FIG. 20

User Information Form

**Musco Control-Link User Information Form**

Customer Name:

(Park) User Name:

Address 1:

Address 2:

City:

State:

Zip:

Phone:

Fax:

Email:

Main Contact Name:

Facilities (Parks) they are allowed to use:

F16.21



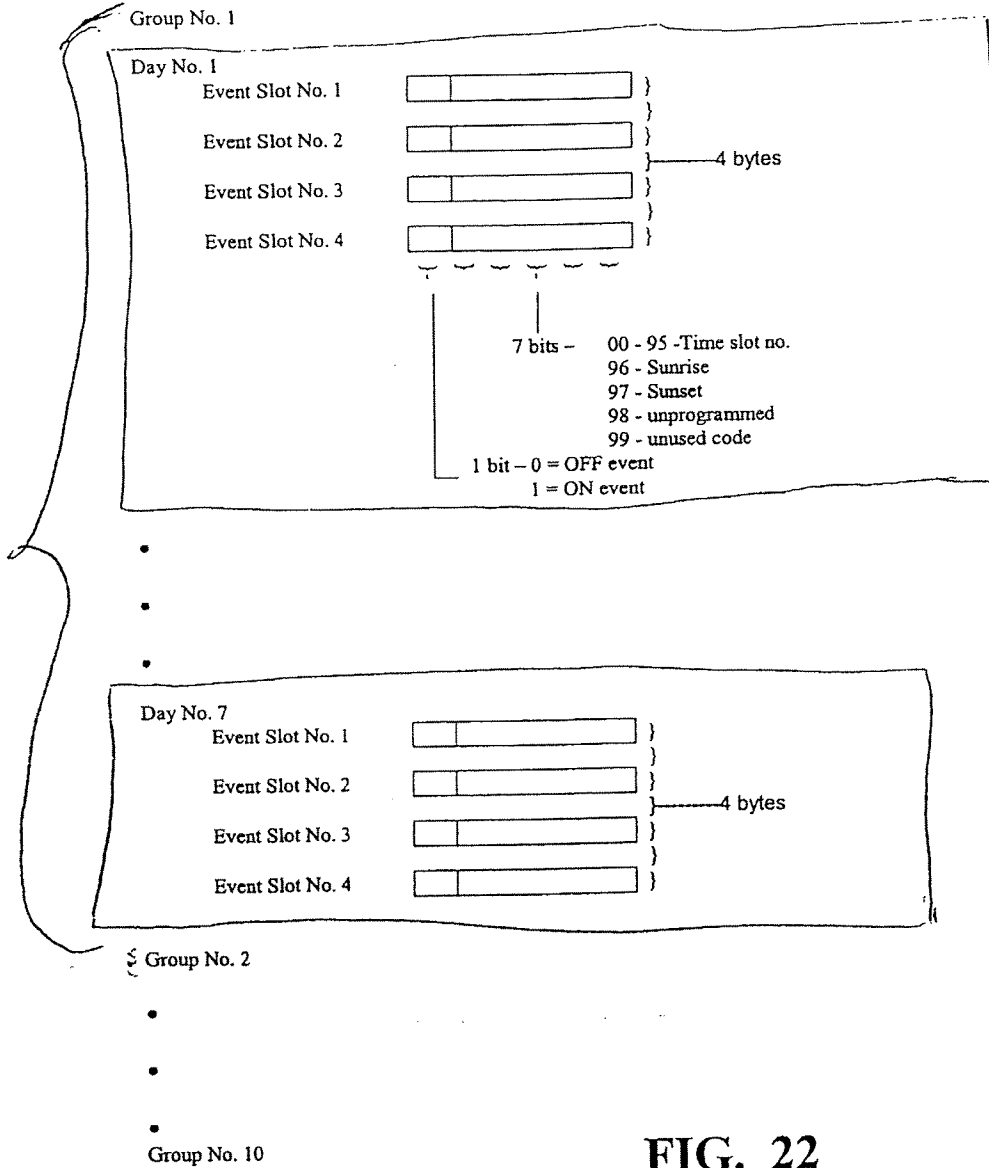


FIG. 22



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/18242

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 H04M11/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 H04M H04Q		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ, INSPEC		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 38540 A (AERIS COMMUNICATIONS INC ;LADUE CHRISTOPH KARL (US)) 16 October 1997 (1997-10-16) page 10, line 25 -page 11, line 20 page 17, line 33 -page 21, line 22 page 25, line 36 -page 28, line 6 ---	1-51
P,X	WO 99 60769 A (CELLEMETRY LLC) 25 November 1999 (1999-11-25) page 21, line 8 -page 24, line 14 page 30, line 18 -page 33, line 35 page 36, line 11 -page 37, line 17 -----	1-51
<input type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents :		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
17 October 2000	23/10/2000	
Name and mailing address of the ISA	Authorized officer	
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo.nl. Fax: (+31-70) 340-3016	López-Pérez, M-C	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/18242

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9738540    A	16-10-1997	AU 702270 B	18-02-1999
		AU 5448996 A	29-10-1997
		BR 9611953 A	25-05-1999
		EP 0894407 A	03-02-1999
		JP 11510976 T	21-09-1999
		CA 2240280 A	16-10-1997
		US 5999808 A	07-12-1999
WO 9960769    A	25-11-1999	AU 4089799 A	06-12-1999

CORRECTED VERSION

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
11 January 2001 (11.01.2001)

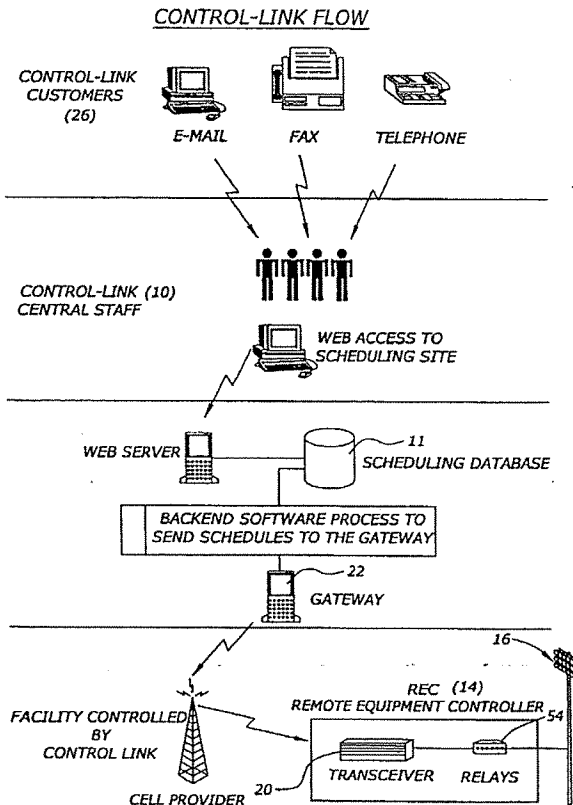
PCT

(10) International Publication Number  
WO 01/03414 A1

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60/142,109                      2 July 1999 (02.07.1999)    US
- (71) Applicant (for all designated States except US): MUSCO CORPORATION [US/US]; 100 1st Avenue West, P.O. Box 808, Oskaloosa, IA 52577 (US).
- (72) Inventors; and  
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- (74) Agent: HANSING, Mark, D.; Zarley, McKee, Thomte, Voorhees & Sease, Suite 3200, 801 Grand Avenue, Des Moines, IA 50309 (US).

[Continued on next page]

(54) Title: MEANS AND APPARATUS FOR CONTROL OF REMOTE ELECTRICAL DEVICES



(57) Abstract: An apparatus to control remote devices or equipment via existing cellular telephone networks. The apparatus receives information from a customer concerning a specific function, which the customer wants to perform at the remote equipment. A Central Control receives this information from the customer and correlates the function to a specific cellular telephone MIN number, which has been pre-programmed in a computer at the Central Control. The MIN number is then sent to a cellular provider. The cellular provider then transmits the MIN number to an antenna, which transmits the MIN number to a remote equipment controller at the remotely located equipment. The remote equipment controller then takes a part of the MIN and gives these numbers to a PLC at the remote equipment controller. The PLC then memory maps the part of the MIN to a specific function to be carried out by the remote equipment controller. Then the remote equipment controller carries out specified functions at the remote equipment.



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

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

**Published:**

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9 August 2001

(15) **Information about Correction:**

see PCT Gazette No. 32/2001 of 9 August 2001, Section II

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

5 Title: MEANS AND APPARATUS FOR CONTROL OF  
REMOTE ELECTRICAL DEVICES

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25 CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S.  
Provisional Application(s) No(s) 60/142,109 filed July 2,  
1999.



## BACKGROUND OF THE INVENTION

*Field of the Invention*

The present invention relates to control of  
5 remote devices, and in particular, control of  
remotely located electrical equipment, including but  
not limited to, lighting systems.

*Problems in the Art*

Large area lighting systems are well known in  
10 the art. They can take many different forms. From  
baseball diamonds to playgrounds, to parking lots,  
to golf courses; large area lighting systems are all  
around in today's society.

In some instances, the lighting system is  
15 turned on and off automatically by timers, photo  
detectors, or other devices. This works reasonably  
well if the lights are used on a regular schedule or  
according to regularly repeating occurrences. In  
other cases, employees, staff members, or other  
20 persons must be hired or have the obligation to turn  
on and off the lights, particularly if the lights  
are used or needed only sporadically. Most of the  
time the person maintaining the lights will have to  
take care of several keys for several lights. These

people usually travel back and forth between the field and his/her home and even field to field because the lighting is commonly used during non-business hours. In the time it takes a staff member  
5 to travel, the lights have been unnecessarily left on. Such a problem is further compounded when the staff member is not informed that the lights are no longer needed for a certain event. When the lights are not turned off, this results in a waste of  
10 energy. This waste usually results in a waste of taxpayer's money. The waste of taxpayer money is furthered by the presence of vandalism, which often occurs to remote lighting systems.

An ancillary problem with manual control of  
15 large area lighting systems is that the person in charge normally must handle keys for the electrical boxes or buildings in which the switches or breakers are located to turn the lights on and off. Access by the public at large to the switches is usually  
20 blocked for safety, economic, and practical reasons. Such keys must to carefully handles and be available to control the lights. This can be cumbersome.

There has been some work done with computerized control of electrical loads or systems. The  
25 computer can have a database of instructions that could include turning a device on or off. The

computer could utilize its internal clock or other  
criteria to issue commands. However, such systems  
generally require a dedicated computer to control  
each device or no more than several devices at a  
5 location. Such systems also generally require  
special interactive software developed for each  
application. To change operation of the computer it  
must be reprogrammed, or new software must be  
installed. Either case requires significant time  
10 and expense.

Some attempts at remote control have been made.  
One example uses established paging systems as the  
carrier of instructions to remotely located devices  
which are to be controlled. Paging systems are  
15 attractive because they have currently developed to  
a point where they can carry a significant amount of  
digital data instructions. However, they can be  
somewhat costly, including communication costs.

The paging system could include a central  
20 repository of instructions. Control of remote  
devices based on the central repository is  
accomplished by sending out paging messages with  
control instructions carried therein to a paging  
receiver at the remote device. While this can  
25 eliminate many of the problems associated with other  
methods of operating lighting systems, a major

deficiency with paging systems presently exists. In the United States, paging systems cover most densely populated geographic areas. Most major-sized cities have good coverage. However, coverage is lacking in many other places. Of course, electrical devices, including large area lighting systems, are not limited to big cities. In fact, the need for remote control of devices may be more urgent in less densely populated areas. Thus, while paging systems offer some promise, they simply will not work in some areas because paging communications do not reach those areas.

Furthermore, paging systems tend to be one-way only, and therefore of limited capacity and options. Two-way paging is presently only in development. Digital paging systems are also in development, but it is estimated that infrastructure for substantial geographic coverage is several decades away.

Remote control of devices using DTMF signaling is in use. An example is remote control of the functions of an answering machine by pressing different telephone keys. This can be accomplished over regular or cellular phones. However, because it involves establishing a telephone connection with the remote device, it must use the voice channels. This is not satisfactory. Voice channels are not

always available. They can be unreliable. This also involves the cost of using the voice channel while communicating the instructions.

A wireless communications system with more  
5 geographical coverage is the cellular telephone system. It is attractive because of this broader geographic coverage and its existent infrastructure. Therefore, like the paging network, capital costs of developing and installing a new  
10 infrastructure could be avoided. It is also attractive because it has a built-in confirmation function. However, it is extremely limited in the data that it can carry, especially out to remote devices, without invoking its voice channels. For  
15 example, because of inherent limitation in the present cellular communications protocol in the USA (Advanced Mobile Phone Service or AMPS), it may be able to carry only three digits of instructions in each call via the last four digits on each cellular  
20 phone's Mobile Identification Number (MIN), a ten digit number in the form of a conventional telephone number; i.e. abc-def-wxyz, where a,b,c,d,e,f,w,x,y, and z are a single digit including and between 0 and 9, and where abc is the area code (three digits),  
25 def is the identification of the local central switching office (CTO) for the land based telephone

system (three digits), and wxyz is a four digit identification for the phone (equivalent to the "line" number in conventional phone systems). This is well-known and widely documented.

5 Under Federal Communications Commission (FCC) regulations, two cellular phone carriers for each geographic area are each given 416 duplex voice channels, and 21 control channels. Carrier 1's channels are called the A channels and carrier 2's  
10 channels are called the B channels. Forward control channels (FOCC's) are from the cell base station to a cell phone; reverse control channels (RECC's) are from the phones to the base station. Under AMPS protocol, up to three digits in the MIN can be  
15 used for carrying data on the forward control channels.

An advantage of using the control channels of AMPS is that the messages are cheap because they are short and do not involve the voice channels. Also  
20 the control channels are transmitted at higher power than the voice channels, have better error correction and better frequency use, and have less traffic. Therefore, they are more reliable as a communication link.

25 Therefore, current cellular telephone systems and protocols (e.g. Advanced Mobile Phone System

(AMPS) in North America; other similar analog systems are NAMPS and ENAMPS) are simply unacceptable because of the limitation of information that could be included as instructions or control in cellular calls.

To have meaningful control of remote devices usually requires communication of more than three digits of instructions. At a minimum, this limitation would not allow an acceptable level of flexibility for many applications.

Also, the utilization of MINs to both serve to instigate a cellular call and, with the same number, effect an operation (e.g. turning lights on or off) at a remote site is not indicated as a realistic use of MINs or the cellular network.

One example of a cellular telephony based remote control system is that of Cellemetry of Atlanta, Georgia. It provides the means of sending short, telemetry-like messages over the cellular telephone system. Examples include reporting (a) alarm panel status, (b) utility meter readings, (c) vehicle and trailer location, and (d) vending machine status. It does utilize the overhead control channels (FOCC's and RECC's) of cellular telephone systems to communicate the information. However, its primary uses involve transmitting data

or information or status from remote locations to a central location.

One specific example involves soft drink vending machines. Reports can be communicated to a central location regarding how much product has been sold and/or how much money has been received and/or how much change has been dispensed. Another example involves turning off a machine or turning security on at the machine. However, there is no known ability with such systems to have individualized schedules or control options at each remote device that can be handled via the three digits of a cellular control channel registration message sent over the FOCC.

Such a system could use different MINs to set and reset flags in a programmable logic controller (PLC), for example, through a single input/output port, but there is no known controlling of resistive or inductive loads with MINs mapped in a PLC memory to functions. There is no known instruction set coded to MINs. The problem is one of availability of MINs. If each remotely positioned PLC with a cellular radio were given ten instructions to which it would respond, the cellular carrier would have to provide ten unique and distinct MINs for each such radio. If there were only two radios, only 20 MINs



would be needed. But one hundred radios would need  
1000 MINs. One thousand radios would need ten  
thousand MINs and so on. If there are any  
meaningful number of remote devices to be controlled  
5 (and remote radios), there would not be enough MINs  
or the number of MINs per phone would have to be  
restricted.

Essentially, cellular systems have wider  
coverage geographically than paging systems, but  
10 much more restricted data capacity. Therefore,  
cellular systems are not indicated to be viable  
candidates for flexible remote control of devices.

There is no known existing system that remotely  
controls resistive or inductive electrical loads  
15 according to a centralized schedule through the  
cellular system control channels.

The state of the art has not revealed a way of  
solving the conflicting concerns of cost, capacity,  
and coverage relative to centralized, automated  
20 control of multiple remotely located electrical  
devices. Therefore, there is a need for improvement  
in the art.

*OBJECTS, FEATURES, AND ADVANTAGES OF THE  
INVENTION*

A principal object of the present invention is therefore to provide an apparatus and method of  
5 controlling remotely located devices, which improves over or solves the problems and deficiencies in the art.

Other objects, features, and advantages of the present invention is to provide an apparatus and  
10 method as above described which:

- a) Is wireless.
- b) Does not require specialized lighting control software or the need for distributed software or updates.
- 15 c) Facilitates low cost use of communications networks (e.g. control channel of cellular, Internet).
- d) Does not require a dedicated PC at each remote location.
- 20 e) Does not require a telephone line for each remote location and eliminates expensive installation of phone lines.
- f) Does not require additional phone lines or hard wiring.
- 25 g) Reduces human time and the chance of human error.

- h) Is cost effective.
- i) Reduces staff legwork and time traveling from location to location, before or after events.
- j) Eliminates human resources, time, and cost to physically travel to location(s) and manually operate the remote devices.
- k) Saves energy by operating the remote devices only when they are needed.
- l) Uses existing communications infrastructures (e.g. Internet, telephone networks, cellular networks).
- m) Allows for centralized support services.
- n) Provides for easy training of end users (operators, customers, and interested persons).
- o) Optionally provides a confirmation sent for each new schedule or change.
- p) Is especially flexible for variable schedules at multiple locations.
- q) Saves time.
- r) Saves money.
- s) Can be predominately automated.
- t) Allows for centralization of data yet distribution of individualized control at each remote device.
- u) Reduces need to distribute and track multiple sets of keys.

v) Is vandal resistant.

w) Has significant flexibility.

x) Is retrofittable.

y) Adapts to existing facilities, systems and

5 devices.

z) Is expandable and upgradeable.

aa) Is reliable.

bb) Does not tie up voice channels.

These and other objects, features, and

10 advantages of the present invention will become more  
apparent with reference to the accompanying  
specification and claims.

#### SUMMARY OF THE INVENTION

The present invention involves methods and  
15 apparatus for controlling remote devices or systems.  
The present invention details a way for a user to  
control a plurality of functions at a remote device  
or location by using the existent cellular telephone  
system, a control center, and a remote equipment  
20 controller at each remote device or system.

A control center is established, preferably  
including a computer. An end user of a remote  
device or system can contact the control center,  
including via Internet, e-mail, phone, cell phone,  
25 fax, or even mail, to request performance of

operations by the remote device or system according to a schedule. The control center stores the schedule and assigns or codes the desired request to one or more MINs (mobile identification numbers) of a cellular telephone system. The MIN is a ten digit number which correlates to a cellular phone number. The control center is assigned a plurality of MIN's assigned by a cellular carrier. The MIN's can be designated with area codes that are not accessible by common carriers. Therefore, a standard cellular phone cannot be called using the MIN's assigned to the central location.

The remote equipment controller includes a processor with memory that is pre-programmed with the authorized MINs and functions for the particular remote device. The processor is operatively connected to components that can effectuate a function in the remote device upon appropriate instruction from the processor. When the schedule indicates an action should occur at the remote device, the control center retrieves the MIN for the function chosen by the user, and the MIN is sent to the cellular provider. The cellular provider then calls the MIN of the remote radio located on the remote or system. Once the radio receives the call from the cellular provider, it passes all ten

digits of the MIN to the processor (e.g. a PLC or programmable logic controller). The processor uses a memory lookup table to map the digits (e.g. the last three digits of the MIN) to a specific pre-

5 programmed function. Once this function is located, the processor then performs this function. Thus, the remotely located device can be controlled, even according to multiple instructions, by communication through the very limited data headroom of the

10 control channel of a cellular telephone system.

Central control can utilize what is called a gateway to the cellular network to communicate to the remote cellular radios and to store both the schedules and the coded MINS.

15 As used herein, the terms "central control" or "control central" refer sometimes to "central control" alone and sometimes to "central control" and a dedicated gateway to the cellular network. In other words, the functions attributed to central control could be

20 performed with appropriate components completely at central control, or some functions (e.g. storing of database, use of database, interface with the cellular network) could be delegated to another system, such as a gateway system, as will be further discussed below.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagrammatic overview of a system according to a preferred embodiment of the invention.

5        Figure 2 is a diagrammatic overview of how instructions are communicated from a control center ("Central Control") to a plurality of remote devices.

Figure 3 is a diagrammatic overview of how  
10 persons communicate with Central Control.

Figure 4 is a diagrammatic depiction of voice and control channels relative to a cellular transceiver.

Figure 5 is a simplified diagram illustrating  
15 area code geographic coverage for the United States according to a preferred embodiment of the invention.

Figure 6 is a simplified diagram illustrating  
local central switching office geographic coverage  
20 for an area code of Figure 5.

Figure 7 is a simplified diagram illustrating mobile identification number geographic relationship for local central switching office coverage of Figure 6.

Figure 8 is a diagrammatic depiction of the system of Figure 1 with respect to a remotely located lighting system for a ball field.

Figures 8B and 8C are an additional  
5 diagrammatic depictions of the system of Figure 1.

Figures 9 and 9B is a diagrammatic view of a Remote Equipment Controller of the lighting system of Figure 8.

Figure 10 is a depiction of a lighting schedule  
10 for the ball field of Figure 8.

Figure 11 is a depiction of a data table filled out and placed in an REC or LCC to set forth which contactors and relays control which zones of a lighting system.

Figure 12 is a diagrammatic depiction of how  
15 control instructions are sent and implemented at the ball field.

Figures 13-15 are screen displays of a graphic user interfaces for entering schedule information at a web  
20 site, either of central control or a gateway. Figures 16-21 are examples of forms used to collect data for inclusion in the database used to control the remote devices and to communicate with customers.

Figure 22 is a diagrammatical illustration of the  
25 data structure of a schedule according to an embodiment of the invention.



Figure 23 is a diagrammatic depiction of a communication according to an embodiment of the invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

5 To assist in a better understanding of the invention, a detailed description of a preferred embodiment will now then be set forth. It is to be understood that this describes but one specific form of the invention can take, and that others are  
10 possible. Appended drawings will be referred to as description.

A brief overview of the preferred embodiment in the particular environment for this example of the invention will be given. A specific description of  
15 the structure or physical components of the preferred embodiment will follow. Thereafter, a discussion of how the structure functions in its working environment will be set forth. Finally, operational matters and features, as well as  
20 alternative embodiments, will be discussed.

#### OVERVIEW

This embodiment will be discussed in the context of remotely controlling lighting systems at a number of remote locations. However, it is to be  
25 understood that the invention can be applied in a

variety of ways to a variety of remotely located equipment.

The general concept of a system according to the preferred embodiment is illustrated in Figure 1.

5 What will be called Central Control 10 includes a computer having a significant amount of memory and processing power. A plurality of lighting systems 12, located remotely from Central Control 10, each include what will be called a Remote Equipment  
10 Controller (REC) 14 which includes components that can turn lights 16 for each ballfield 18 on or off. REC 14 further includes a cellular phone or radio 20.

As shown in Figures 1 and 8C, Central Control  
15 10 is in communication with a dedicated gateway system 22 (DGW), which in turn is in communication with the Intersystem Signaled Network (ISN IS-41) 24 that interlinks all the cellular phone systems in the U.S.

20 Central Control 10 and/or gateway system 22 includes a database of on-off schedules 11 for each lighting system 12. At the appropriate times, software and equipment at Central Control 10 (or gateway 22) instigates a call to the appropriate  
25 radio 20. As will be discussed in more detail below, through this procedure REC 14 can be

instructed to turn the corresponding lighting systems 12 on or off, according to schedule. Thus, control of all the remotely located lighting systems can be accomplished from a central location, in a wireless manner to wherever cellular communications can reach (which is almost the entire U.S.), and in an automated, labor-saving, cost-effective fashion.

As further illustrated in Figure 1, the system could also allow input from what will be called customers 26 and interested persons 28. Examples of customers are municipal park and recreation departments, school districts, and athletic associations. Interested persons can be athletes, parents, or fans of athletic teams using ball fields 18, and thus interested in game times and locations.

Customers/interested persons 26/28, through conventional means such as personal computers, can access Central Control 10 through Internet 30. Schedules and other information regarding the games or use of ballfields 18 would be available to authorized persons. Additionally, authorized persons could communicate changes to schedules 18, post messages, or submit other information to Central Control 10, so that schedules 18 or other important information could be kept current.

By referring briefly to Figure 8, a personal computer 32, phone 34 or fax 36 could be used by customers 26 to transfer information to Central Control 10 which then instructs the REC's 14  
5 accordingly over the cellular network.

The personal computer, phone or fax (or other communication method) transfers to Central Control 10 information concerning functions the customer wishes to perform at the remote lighting system 12.  
10 Central Control 10 matches the request of the customer with a cell phone 20 MIN and then sends it to the REC 14. The REC 14 receives the MIN; interprets this as a function and controls the lights 16 of lighting system 12 in the desired way.

15 Such a system can be used for a variety of different purposes. Examples are lights at baseball fields, parks, golf courses, swimming pools, parks and bike trails. Other examples are possible.

### **APPARATUS**

#### 20 **Schedules**

As explained above, customers 26 can utilize input devices such as PC's 32 (e.g. e-mail), telephones 34 or facsimile machines 36 to send in or make changes to schedules 11. These are all

conventional components widely available to the public.

For example, Figures 16-21 illustrate examples of forms that could be given to customers or interested persons. The filled-out forms would be returned to Central Control 10.

The input from customers 26 could be processed by employees at Central Control 10, and then entered into a database of schedules 11.

For example, Figure 16 asks the customer for identification information, security information (section 1), how to contact them either by email or fax (section 2), non-recurring lighting ON or OFF for each lighting zone (section 3), and recurring lighting ON and OFF functions for each zone, including date (section 4). The customer fills this in and faxes, emails, mails, or otherwise gets this to Central Control 10.

Figure 17 provides a form so that information about how the relays are wired can be compiled for entry into the database.

Figure 18 provides a form so that information regarding customers can be compiled and entered into the database to keep track of end users of the lights and make monthly reports to the customers regarding light usage, etc.

Figure 19 describes the facility itself as well as the time zone and whether daylight savings time applies. The database needs this because it is keyed to Greenwich Mean Time.

5        Figure 20 compiles information about the facility owner or authorized agent(s) so that only authorized individuals can send scheduling information to Control Central. It also allows verification of a schedule or schedule change by  
10 Control Central.

Figure 21 is an additional form to compile information about the user of the lights or the facility being lighted.

Figures 13-15 are examples of graphic user  
15 interfaces or screen displays for accessing and entering scheduling and other information into the database. Figure 13 shows that access preferably is password protected. Figure 14 shows that a variety of options could exist relative to use of the  
20 database, including entry of or changing of schedules (see button labeled "Output Control").

Figure 15 shows a web site screen after selecting "Output Control" on Figure 14. Central Control would enter a MIN of a radio 20 in "Unit  
25 Number". If immediate override (see "Immediate Control") of an existing schedule is required (e.g.

if a customer has just called Central Control and asked to turn on lights currently to off according to the existing schedule), Central Control could override the existing schedule right then for any of  
5 the relays/contactors 1-8 for that lighting system.

The "Schedule" section of Figure 15 allows Central Control to enter the schedule for each relay/contactactor (Op 1 to OP 8) for that lighting system, including which days of the week and which  
10 months of the year. The "once" column is for single, non-recurring events (from section 3 of Figure 16). Otherwise, the schedule will recur (from section 4 of Figure 16). Changes can also be made to the schedule.

#### 15 **Internet**

Through standard e-mail, customers can send schedule requests to Central Control 10 over the Internet, and optionally get confirmations back the same way. An advantage of use of Internet 30 is  
20 increasing availability to the public, including at their homes, and its availability almost anywhere and anytime, but with no or limited communications cost.

Internet 30 could also be used to communicate  
25 between Central Control 10 and gateway 22. The

gateway provider could set up and maintain a web site with appropriate user interface and security for these purposes. There is no need for special distributed software to customers 26 or interested persons 28, or the need for dedicated computers at ballfields 18. See Figures 13-15.

#### Central Control

Central Control 10 (in this example via gateway 22) performs a variety of functions. The functions can be as diverse and detailed as desired. For example, control central sends messages over cellular network 24 to the REC's 14. It also can send confirmations that scheduling information has been entered, that a scheduling function has been performed, that a schedule change has been made, etc. to customers 26 via e-mail or fax.

Employees at Central Control 10 review and properly format schedules and deal with scheduling conflicts or other problems. Control central includes a computer (e.g. Dell Computer Corporation PowerEdge Server) with firmware and appropriate software secure from users. A database is maintained to store the scheduling information.



### Communications

To better understand the system of the preferred embodiment, the communications between the components of the system must be understood.

5 Figures 2-7 illustrate the basic communications concepts.

The system relies on the ability to reach a variety of remote locations in a wireless manner by relying on the cellular phone network. Figure 2  
10 illustrates this in more detail. Control central 10 is located in State C, City 1. In this example, there are seven lighting systems (numbered 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, and 12-7) to be remotely controlled by control central 10. Lighting systems  
15 12-1, 12-2, 12-3 are located in State A, City 1. Lighting systems 12-4 and 12-5 are located in the same State A, but in City 2. Lighting systems 12-6 and 12-7 are located in a different State C, and City 1 in State C.

20 City 1 of State A has a cellular carrier C1 that covers City 1 of State A with cells C1-1, C1-2, C1-3, and C1-4. Cellular communications to those cells is controlled by Mobile Telephone Switching Office 40-C1. Carrier C2 covers City 2 of State A  
25 with cells C2-1 to C2-7, which are controlled by MTSO 40-C2. Carrier C3 covers City 3 of State B

with cells C3-1 to C3-3, which are controlled by  
MTSO 40-C3.

Intersystem signaling network (IS-41) -  
connects all Internet carriers

5  
Central Control 10 is located in still a third  
State, namely State C, in City 4. As is well-known  
in the art, Central Control 10 (via gateway 22) can  
communicate with any of the cells of cellular  
10 systems C1, C2, or C3 by using conventional land-  
line telephone gear and dialing up a cellular phone  
in any of those geographic areas. A high speed  
dedicated connection (SS7) between Central Control  
10/gateway 22 and the IS-41 signaling network 24 can  
15 be made. A backup dial-up modem connection can be  
available. Cellular systems C1, C2, and C3 are  
hooked up by high speed dedicated connections to the  
intersystem signaling network (IS-41) 24 that  
connects all cellular carriers. Thus, even though  
20 Central Control 10 or gateway 22 is in one City in a  
first State and a lighting system 12 for a ballfield  
18 in another City in another State, communication  
can be made if the ballfield City is covered by a  
cellular system.

### Cellular carriers

As is further well-known in the art, each cell of each cellular system has a base station 42 which includes a transceiver 44 and an antenna 46 (see  
5 Figure 4). The MTSO 40 associated with each collection of cells communicates with any of the base stations 42 in its system (via land-line or wireless). The base stations then communicate in a wireless fashion to the cell phones 20.

10 Mobile Telephone Switching Office (MTSO), sometimes referred to as an MSC, is established by each cellular carrier in each city or for each collection of cells. It is like a CTO (central telephone office) of conventional land-line phone  
15 systems in that it coordinates calls to and from phones in the area which it covers. The MTSO also connects its cells to the conventional land line telephone system and controls the base station in each of its cells.

20 This wireless ability, along with the existing infrastructure illustrated in Figure 2, allows Central Control 10 (via gateway 22) to communicate with remotely located REC's 14 without the huge capital investment of creating a new infrastructure,  
25 or laying dedicated land-lines to each REC.

### Conventional phone system

The conventional land-line telephone system 22 utilizes central telephone switching offices or CTO's distributed around the country, one for each 5 area code. Communications can go into the conventional telephone system at various times.

This is illustrated in Figure 3. If a customer 26 wishes to communicate with Central Control 10, one way is via a land line call (either voice or 10 fax). Other ways are via a cell call (which could in part involve land line telephone), or via e-mail (again usually by Internet 30). It is even possible for a customer to make a personal visit to Central Control 10 to seek or convey information.

### 15 Cellular phone or radio

Cell phones 20, also referred to as radios 20, are conventional cellular radios. An example is an Ericsson TXR module AM10 AMPS cellular radio (cellular receiver). Such components are relatively 20 small (roughly 2" W by 4" L by 1/2" D), are durable (mostly solid-state), and relatively inexpensive.

The mechanism to send a part of the MIN from radio 20 to PLC 50 is as follows. An AT modem command (industry standard) emulates modem 25 communication protocol and allows radio 20 to talk

to PLC 50 through a serial data port. The communication is full handshake, full duplex and approximately 2400 baud.

#### AMPS Communication Protocol

5 As previously discussed, a significant aspect of AMPS cellular communication is the precise way in which cellular calls are routed. It is important to an understanding of the present invention, to understand this.

10 Figure 4 illustrates one cellular radio 20 in cell C1-1 of cellular system C1. Base station 42 of cell C1-1 services radio 20 and is connected to MTSO 40-C1 of system C1, which in turn is connected to the IS-41 intersystem network 24.

15 MTSO 24, through base station 42, communicates with radio 20 as follows. Forward control channel FOCC and reverse control channel RECC allow the base station 42 and the radio 20 respectively to communicate call initiation information and perform  
20 other functions. Forward voice channel FOVC and reverse voice channel REVC carry the voice messages (audio) to and from radios 20.

Conventionally, use of the FOCC and RECC are for very short times and traffic over these channels  
25 is not as high as the voice channels, where the real

voice communication occurs. Conventionally, FOCC and RECC are primarily used to register radio 20 to enable it to receive or make a call.

As described earlier, because FOCC and RECC are primarily used in this manner, and because of the AMPS protocols, the amount of data communicated over these control channels is limited. Specifically, information on the FOCC when initiating a remote call to radio 20 is limited to essentially the MIN, that is, ten digits in the abc-efg-wxyz format described above. To reach radio 20, the first six digits can not be altered. The first three (abc) are the area code for the call, directing the call to the general geographic area of the home cellular system for the cellular radio 20. The next three (efg) are the local CTO number, a further geographical narrowing. The final four digits of the MIN (wxyz) are an identification number for the specific radio 20 so that the call knows which radio it is supposed to be directed to.

If the MIN sent out by the caller matches with the MIN of the called radio 20, the cellular system assigns the frequencies for the voice channels FOVC and REVC, the duplex communication can begin. Prior to that assignment of a voice channel, all of the

signaling is accomplished solely over the IS-41's  
FOCC and RECC.

Thus, in the instance of Figure 4, if cellular  
radio 20 has the MIN of 080-377-4000, a call from  
5 Central Control 10 (via gateway 22) would involve  
dialing that number. The MIN would be carried over  
IS-41 (reference numeral 24). As is well-known in  
the art so that it will not be described in detail  
here, the IS-41 network 24 is able to discern the  
10 "home" cellular system for that MIN, but also can  
discern where the radio 20 matching the MIN is  
currently at geographically (because radio 20  
periodically sends out its MIN and lets the  
intracellular network know where its at).

15 Thus, the registration process that is used by  
the cellular telephone system to prepare for a call  
to a cellular phone is used here. What is sometimes  
actually referred to as a "page" is made through the  
cellular network to the cellular phone being called.  
20 The cell phone must tell the cellular system that it  
is on and ready. The cellular network notifies the  
entire USA of this (or more accurately, notifies all  
geographic areas covered by the IS-41 intersystem  
network). The cell phone scans for the strongest  
25 FOCC to get to nearest base station and sends its  
MID/ESN/and home system SID (all goes to the

relevant MTSO). The cell phone is registered with local cellular system if everything checks out.

If the home cellular system validates the MIN, the call is registered and is ready to commence. In this example, the radio having the MIN of 080-377-4000 would receive its MIN over the FOCC. This registration process, taking only hundreds of milliseconds, is essentially a "page" which lets the nationwide intra cellular network 26 know that remote phone 20 has come on-line. It is important to note that over the FOCC, only the ten digit MIN is sent to radio 20. In the forward direction (over FOCC from base 42 to radio 20), only three digits of the MIN are available to carry information.

Radio 20 sends the ten digit MIN as well as a 32 bit Electronic Security Number or ESN over the RECC, and therefore only from radio 20 back to base station 42. Thus, the 32 bits are not available in the forward direction for instructions to REC 14. Other information may be sent over the forward or reverse control channels (e.g. home system ID), but such does not change the basic fact that the only "data" so to speak that might be carried over the FOCC (base 42 to radio 20) in the MIN is the last three digits of the MIN. For reasons dictated by the AMPS protocol, only the last three digits are



potentially utilizable for carrying data or instructions.

Therefore, as discussed above, one would be deterred from looking to the AMPS limitation of three possible digits in the FOCC, if one were looking for a way to send digital instructions. However, it is in this very environment that the preferred embodiment functions.

As shown in Figure 4, radio 20 according to the preferred embodiment is given anywhere from one to a substantial plurality of MIN's to which it will respond. Taking again the example of a MIN in the form of 080-377-4000, Figure 5 shows how the USA for example, is divided up into a plurality of area codes 080 through 087. A call from Central Control 10 to 080-377-4000 would route the call to the 080 area code, here illustrated to be in the Northwest part of the United States.

Figure 6 illustrates that the geographic extent of area code 080 is sub-divided into a plurality of regions 370 to 377, each serviced by a CTO 38. Each region is identified by the three digit number and therefore in this example the call is routed to CTO identified by "377".

Figure 7 illustrates that CTO 377 would provide the MIN to the appropriate MTSO 40, which would

track down the cell (here C1-1) receiving the  
strongest signal or vice versa relative to the radio  
with the MIN 080-377-4000, and sends the MIN over  
the FOCC at base station 42 in cell C1-1, to that  
5 radio 20. Thus, radio 20, responding to this  
called number or MIN, is found in msec over the  
cellular network control channels.

#### Gateway

In one embodiment of the invention, a third  
10 party administrator (in cooperation with input from  
Central Control 10) could be used to control the  
calling to cellular radios 20. The third party  
could also obtain proprietary area codes, CTO  
numbers, and phone IDs unavailable to other persons  
15 or companies. This would ensure that no accidental  
or intentional but unauthorized caller could send  
calls in the system of the invention.

The third party would effectively function like  
an MTSO, but have a proprietary control office for  
20 the cell phones in the system. By appropriate  
controls and software, the third party could  
restrict any outgoing calls in case an MIN and/or  
MIN/ESN is poached.

Furthermore, the third party could send  
25 cancellation messages after a certain time for each

paging to free up space and capacity over the cellular control channels.

Information could be sent to the third party from the Internet, any intranet, or land-line. This  
5 third party, called a "gateway" between Central Control and the regular cellular system, would essentially act as a "home" cellular system or MTSO for all cellular phones associated with the preferred embodiment. Therefore, all those cell  
10 phones would essentially be roaming the cellular intersystem network. The gateway would place a "call" to a roamer cell phone via its special MTSO programmed to accept the special MIN's.

An example of such a third party gateway is  
15 Cellemetry of Atlanta, Georgia. In their system, the MTSO can be programmed with up to ten MIN's per cellular radio. Higher numbers of MIN's per phone are possible.

Figures 13-15 show how the gateway system could  
20 be accessed by Central Control, and how scheduling and other relevant information can be provided from Central Control 10 to gateway 22 via a private , secure location in the gateway website.

## Remote Equipment Controller or REC

In this embodiment, communications hardware, software, and networks have been described which allow Central Control to use the quick, low cost control channels of the AMPS cellular telephone protocol to contact a plurality of remote cell phones using existing infrastructure. Use of this communication to affect a function at a remote lighting system 12 involves utilization of a remote equipment controller or REC 14, which will now be described in more detail.

By referring to Figures 8 and 9, the REC 14 can be seen in one form. For lighting systems, particularly outdoor systems, REC 14 can be contained in a lighting contractor cabinet or an LCC 48 (e.g. NEMA 4X enclosure-fiberglass (indoor) or aluminum (outdoor), 16" (H) x 14" (W) x 6.25" (D)), fully assembled and factory tested. The LCC could be separate.

Major components of REC 14, in addition to cellular radio 20, include controller 50 (e.g. a PLC), relay board 52 and power supply 56. The contactors and fuses/breakers could be in the LCC. Relevant characteristics of these components are set forth below.

Controller 50 can be a 87C52 from Intel Corporation. It includes non-volatile memory into which a database is pre-programmed. Authorized MIN's for radio 20 are mapped to instructions in the database. The instructions are then carried out by PLC 50 by sending electrical instructions to other component(s) of REC 14. When a call is made to REC 14 using a MIN to which REC 14 responds, controller 50 (via appropriate connection to radio 20) is given the authorized MIN and thus can map the MIN to its stored instruction set for that REC 14. Non-volatile memory retains information even in power outages or brown-outs.

Multiple (e.g. eight) output relays are used on relay board 52 to control electrical loads such as conventional lighting contactors .

Multiple lighting contactors 54 (e.g. six Siemens Sirius 3R series individual Form C contacts, hermetically sealed maximum 7.5 amp at 120 VAC)) are controlled by the relays of board 52. By this method, the very high voltage/current needed by the high-powered lights (e.g. 1500 Watt Metal Halide lamps), can be turned off or on by much lower voltages/currents.

Optionally, multiple (e.g. eight) three-position selector switches (Off-On-Auto or OOA,

Make-Before-Break or MBB) could be included in REC  
14 or LCC or a separate enclosure for convenient  
access. They could be door mounted, with one red  
pilot light for each OOA switch. The function of  
5 these switches will be discussed below.

Electrical power could be delivered through a  
duplex receptacle - 120 VAC (for field service  
tools). Primary and secondary fusing as well as  
terminal blocks could be used for this incoming  
10 power, load wiring and REC control. The input power  
supply (e.g. 115 VAC (+/- 10%)) can have replaceable  
fuse and transient protection. All internal devices  
are widely available. Some could be DIN rail  
mounted for easy replacement. Approvals and  
15 standards include UL 916—energy management system  
for the REC, and FCC part 15 for a Class A device.

REC 14 includes separate line voltage Off-On-  
Auto switches (OOA) for each control circuit. New  
installations are pre-engineered and factory  
20 assembled which includes all necessary contactors,  
OOA switches and control transformer, fuse blocks ,  
and terminal strips. REC 14 allows manual control  
of high voltage 3 phase sports lighting or automatic  
control from the REC.

REC 14 could include a short mast, noise free, high impact durable antenna (when unit is mounted outside) or a standard whip antenna for inside.

Optionally an internal heater with regulating thermostat could be factory installed (recommended where outside temperature drops below 15 degrees F.).

REC 14 can be pre-wired, fully tested wiring harness between relays and lighting contactors. Plug-in screw terminals accommodate up to No. 14 AWG wire . It can have snap-in electronic circuit boards with built in test buttons to verify operation ability to test the unit with a direct page or by a portable computer connected through a serial communication port.

#### **OPERATION**

The present system first requires input from the customer as to an on/off schedule for the customer's lights. As discussed previously, this information can come into Central Control 10 in a number of different ways and from almost anywhere. Figure 10 illustrates a schedule for the hypothetical Twin Peaks Park District of State A, City 1. Five different lighting zones are to be controlled, one being simply security lights. ON

and OFF times are formatted by the customer or Central Control 10 in a fashion that can be entered into the Central Control database.

Figure 11 illustrates some of the additional  
5 information that would be pre-programmed into that database. Details about the relays and contactors in the REC 14 for the lights in each lighting zone are pre-known and in the database. A default schedule could optionally be entered.

10 Central Control's computer therefore knows when to turn each lighting zone on and off. The customer sets the schedule.

Alternatively, the authorized customer can enter or change on/off times. A template such as  
15 Figure 10 or 11 could be used to enter a new ON/Off schedule or to review or modify a current schedule.

As shown in Figure 8, the user of the system can send information regarding instructions at a remote lighting facility via the Internet, e-mail, a  
20 cellular telephone call, or even a standard call. When this information is received at the central location, the user's request will be identified and matched to instructions contained in the PLC at the remote equipment controller. The instructions  
25 contained in the remote equipment controller can be



standard instructions or can be personalized through each user.

The central location will have a plurality of mobile identification numbers designated from a cellular carrier. This cellular carrier will have access to area codes outside of the common carrier accessibility. Therefore, a standard cellular or standard telephone could not be called using the system. Figure 3 details an exemplary hypothetical list of possible MIN numbers designated to the central location for a specific user.

The cellular telephone system has been split up into an "A" channel and a "B" channels. All receivers can listen to only one channel, A or B, at any given time. Also, a radio can respond to "even" or "odd" MINs but not both. Therefore, looking at Figure 3 the representation of 080-377-4000 ("even" MIN) would represent the same function as 080-377-4001 ("odd" MIN). They are mapped to the same function.

By referring to Figure 12, most MIN's are assigned from a cellular provider a plurality of mobile identification numbers to achieve a plurality of functions. The cellular provider will have access to area codes not accessible to common carriers. These assigned mobile identification

numbers can range from a plurality of last four digits in an area code to a plurality of office codes and available last four digits inside those codes.

5           PLC 50 can be pre-programmed with desired functions. PLC 50 contains the memory map where the functions are stored. Each memory location inside the memory map directly maps to a respective MIN number. By referring to Figure 12, a remote  
10 equipment controller (REC 14) or wireless remote lighting controller receives the MIN from the cellular provider. REC 14 is normally collocated with the lighting system.

          Referring to Figure 8, Control Central receives  
15 information via the Internet or telephone from the customer location. This information is then translated to a respective function or MIN number and transferred to the cellular provider.

          Central Control 10 places a call which goes to  
20 that carrier's computer (MTSO). It checks where the remote radio 20 is (if in its "HOME" area, the carrier's computer knows because of registration process). If radio 20 is in a "VISITING" area, the intracellular network finds and then knows where it  
25 is at. The carrier sends a MIN to the location of a

nearby antenna, which broadcasts the MIN and rings radio 20.

Once the mobile identification number for the specific function chosen by the user has been  
5 obtained, the number is then sent to the cellular provider that has assigned the MIN's to the central location office. Referring to Figure 8, the cellular provider then sends this information to  
10 either a satellite (or an antenna, through broadcast or hardwire), inside of the cell where the remote equipment controller is located. The MIN is then sent to the phone via the control channel of standard cellular telephone usage.

A control channel only carries data. By using  
15 the control channel there is no interference with the voice channel.

Radio 20 essentially listens for its number and acts according to logic at REC 14. REC 14 receives and stores messages. It looks at the MIN received  
20 at radio 20, in the form "abc-def-wxyz", where abc = area code (proprietary to gateway so no one else can interface with the functioning of these communications), def = CTO number, wxyz = w000 to w999; giving possibly up to 1000 instructions. It  
25 automatically turns the lights on or off per user

schedule. It is thus remotely controlled by a cellular signal.

Referring to Figure 9, when the remote equipment controller receives the MIN via cellular radio 20, the remote equipment controller will decode the last three digits of the MIN. The PLC will then take these three digits and memory map them to a location containing the function desired to be performed at the remote lighting system. When that function has been found, the PLC then sends confirmation back to Central Control and the function is performed.

Looking at Figures 12 and 13, there is a possibility for a plurality of functions. In the example of Figure 3 there could be hundreds of functions. There may be more in the future.

Thus, by this method the schedule for each lighting system is automatically accomplished by Central Control sending out pages through the control channels of the cellular phone network to appropriate REC's at appropriate times.

The primary MIN "wakes up" radio 20, or in other words, lets radio 20 know that an instruction will follow shortly (within a pre-selected time—e.g. 60 seconds). The gateway codes a plurality of what will be called "secondary MINS" to a plurality of functions to be

carried out by REC 14, and stores those secondary MINs in the gateway database. The gateway continuously scans (e.g. every minute) the schedules in the database.

Whenever the schedule for a particular zone of lights indicates that an action time approaches for that zone of lights, the gateway encodes a MIN based on the current state of the relays for the particular REC involved and then fires off that secondary MIN into the IS-41 signaling network [with appropriate routing so that it will be transported to the appropriate radio 20.

Radio 20 receives the secondary MIN, and passes all digits of the MIN to PLC 50. The pre-programmed map in PLC 50 decodes the last three digits xyz and generates the appropriate control signal to the appropriate relay(s) to either turn that zone of lights ON or OFF, depending on the schedule.

In practice, each relay is activated or deactivated by relatively low voltage but controls whether the high voltage needed by a bank of sports lights, for example, is supplied to the lights to turn them ON and operate them. Each individual relay or group of relays is controlled by one or more MINs; one set of MINs to turn the relay(s) ON; one set to turn the relay(s) OFF. Therefore, if the schedule requires that substantial sized area to be lit (i.e. which requires several banks or zones of lights to turn on), more than one relay must

be controlled at the scheduled time. Multiple MINs can not be sent to a single radio 20 in parallel; the gateway must send a "primary" MIN first, to "wake up" or "alert" radio 20 and then send a "secondary" MIN to perform a control function. The gateway waits for a predetermined time (e.g. approx. 60 seconds), and then sends another "wake up" primary MIN followed by a secondary MIN to perform other control or scheduling function, and so on until all necessary scheduling functions have been specified. The gateway must therefore initiate the whole procedure far enough ahead of the scheduled time for use of the field so that all lights are on at that time.

The gateway knows which radio 20 was just woken and knows which instruction it needs to send to that radio 20. Therefore, the secondary MINs do not have to be unique for each radio 20. This allows for many less proprietary MINs to be obtained (MIN reuse). It can also allow for a standard MIN set to be created regardless of what radio 20 is involved. The gateway locks any other message from going to a waken up radio 20 until either a secondary MIN is received and a confirmation is sent back or a set period of time expires (the radio "times out").

The back end software at the gateway essentially operates according to the following flow chart:

Scan database on request or every set amount of time.  
Look for schedules whose time is up for transmission.

Encode secondary MIN based on an action to be performed for each REC related to each schedule up for transmission.

Send Primary MIN to relevant radio to wake it up.

- 5 Follow Primary MIN with the encoded secondary MIN to the radios.

The gateway can use a UNIX or Windows NT based computer. The Webserver (e.g. Microsoft Internet Information Server or Apache) can run on Windows NT or  
10 Unix. The website of the gateway can be programmed in a combination of Java, HTML, Microsoft SQL, Delphi, and Perl languages. The database can be programmed in Microsoft SQL, Oracle, or Progress.

It is possible for feedback to be generated by the  
15 REC and sent back to the gateway. As discussed above, the reverse control channels have the advantage of carrying the 32 bit ESN as well as the MIN. By appropriate programming of radio 20 and PLC 50, the ESN can be masked and replaced with data. In the present  
20 embodiment, 8 bits are used to tell the gateway such things as (a) instruction received and executed or (b) instruction received but not understood. If radio 20 wakes up with the primary MIN but does not receive a secondary MIN within a set period of time, PLC 50 can  
25 execute a "time out" function on its own, and could

indicate this over the 8 bit message masked over a part  
of the ESN.

In any of the above cases, the gateway would receive  
and decipher the 32-bit return message from the REC. The  
5 gateway could then send a communication in any of a  
variety of forms to Central Control so that Central  
Control knows what occurred. Central Control in turn  
could communicate in any of a variety of ways with its  
customers.

10 Because of the 32 bits in the ESN, a return  
message to the gateway could include other  
information. Examples are: what the signal  
strength was of the received instruction, how many  
times radio 20 had to be paged before it sent a  
15 confirm back to the gateway, the identity of the  
switch that the antenna connected to, and status  
codes, such as whether the function was completed or  
not.

#### *OPTIONS, ALTERNATIVES, FEATURES*

20 The included preferred embodiment is given by  
way of example only, and not by way of limitation to  
the invention, which is solely described by the  
claims herein. Variations obvious to one skilled in  
the art will be included with the invention defined  
25 by the claims.



One option of the system is to confirm the carrying out of the schedules to the customer. As shown in Figure 3, a customer can be notified via email or fax that the schedule has been entered into Central Control and/or carried out at the customer's lighting systems.

Some other options are as follows. There may be times where the lights need to be turned on or off outside the established schedule in the database at Central Control. For example, there may be a need to turn lights ON early (for a pre-game test or unscheduled event) or keep lights ON longer (if a game is running later than planned) or turn lights OFF early (game canceled or cut short, bad weather).

One override method one is a telephone override. It works in this manner: customer will call a toll-free number and speak with a Control Central staff person. That person will validate the customer's PIN against the central database and enter the requested changes on the customer's behalf. In the case of trying to extend the ON time, users need to call at least 15 minutes before scheduled OFF time to ensure that the new messages will be received by the REC 14 before the automatic OFF time. Another override method two involves the use of the Off/On/Auto (OOA) switches previously

described. Each REC will have individual OOA switches for each control zone. The REC will operate automatically when the OOA is in the AUTO position. In the ON position the lights will remain  
5 ON until the OOA switch is changed to OFF or back to AUTO.

Another option is to assign more than one MIN to a cell radio 20. One line (the first MIN) is rung, then the calling phone hangs up. The PLC  
10 could go into wait loop where stop and listen (the PLC is alerted). If a call is received on any of other nine lines (e.g. nine) within a period of seconds (e.g. 30) then PLC 50 knows to do function  
1; if line 2, function 2; ...; if line 9, ....., function  
15 8.

During a power failure, relays go to their default state (i.e. NO or NC). After normal power returns, the REC unit will auto-restart and resume normal operation. PLC 50 remembers the last state  
20 and schedule of the relays prior to power loss and restores them to the appropriate state upon resumption of power.

The simplest use of the system according to the preferred embodiment, is to simply initiate the  
25 cellular page to remote radio 20. The PLC associated with that radio 20 reads the MIN that is

attempted to be paged by Central Control 10, and in particular, reads the last three digits of the MIN. Once the page is decoded, the PLC simply turns the lights on or off.

5           As is known in the art, if there is a need to send data back to Central Control from the REC, one might be able to use the 32 bit ESN in reverse control channel communications from radio to control central. This would allow up to 32 bits of  
10 information to be sent back for remote monitoring and status information. The ESN could be "masked out" by the gateway company. It can also be reprogrammed on the fly in the field.

Some examples of remote monitoring over the  
15 reverse control channel, as opposed to remote control over the forward control channel are as follows:

- a) Measurement
- b) Poll information
- 20 c) Monitor, use thresholds, if exceeded, let us know
- d) Alarm monitoring
- e) Security alarms
- f) On-demand status
- 25 g) Location/GPS
- h) Track mobile equipment

- i) Motion detectors or sensors
  - j) Can override PLC if game too long.
  - k) Can function as security device/alarm if notices activity during "off" hours
- 5        l) Rain sensors
- m) Photo detectors
  - n) Measure lamp life
  - o) Detects malfunction or light is out
  - p) Data gather lamp life, field usage, energy
- 10       usage

Areas and facilities that can use this device are:

- a) Park districts
- b) Schools
- 15       c) Ballfields
- d) Sports complexes
- e) Golf course
- f) Ski resorts
- g) Racetracks
- 20       h) Sportslighting
- i) Security
- j) Parking lots
- k) Door locks

25       One alternative embodiment to this, is that there would be a plurality of books of functions

inside the PLC. The first call to the remote equipment controller would identify which book the functions are located in and the next call would identify what function to use inside that book.

5           And yet another embodiment splits the clock inside the PLC into segments. Each segment would have up to 1,000 (000-999) functions. See Figure 13. By using this method the central location can greatly expand the amount of functions used in a  
10           limited MIN number range. Therefore, each MIN number would represent a different function depending on what time it was. Thus if a central location only had 500 MIN numbers, by splitting the clock into five segments the central location would  
15           have up to 2,500 functions available. In order to achieve this operation the clock(s) at the central location and the clock at the remote equipment controller would have to be synchronized to avoid error. Therefore, a command coming from the central  
20           location would have to synchronize the clocks at a time interval to stop the clocks from drifting.

Confirmation options. Multiple confirmations could be sent to customers, e.g.:

25           a) Schedule request received (e.g. via e-mail to end user from control central)

- b) Action transmitted to gateway company (e.g. e-mail to end user)
- c) Action was executed at REC.

5           The invention has been described in some detail as to the requirements for each aspect of the invention. Specific examples are now shown of a data representation of the time schedule and a command instruction set that could be used. The  
10 creation of a data representation of a time schedule and a command instruction can vary as is well known in the art and the data representations shown are by way of example and are in no way limiting.

#### Time Schedule

15           Figure 22 shows how the customer's schedule can be represented by a data structure or data format that reduces the amount of memory needed and the amount of data that needs to be communicated in a complete one week long time schedule. One method of  
20 doing so involves grouping the relays into groups. For example, a group size of 8 relays can be selected. A number of groups can be determined, such as 10 groups. For each group, a number of events can be assigned for a given time period  
25 during which the events are to occur. Turning on the lights and turning off the lights are examples

of events. In one embodiment, four events can occur in a day. This would, for example, permit one or more groups of relays to turn on and then off and then on and then off in a single day. To decrease the amount of storage required for a time slot while still permitting small enough time divisions such that lights can be efficiently controlled, 96 time slots per day can be used. This permits 15 minute wide time slots each day.

When only two types of events are used (i.e. ON and OFF), these events can be represented by a single bit. When 96 time slots are used these time slots can be represented with 7 bits. Because 7 bits permits 128 different discrete values there will be additional space. One use of this additional space is to add time slots for sunrise and sunset.

The table below also summarizes the space allocation required for a one week long schedule.

	<i>Space required</i>
Event	8 bits (1 byte) 7 bits for time slot 1 bit for ON/OFF
Day	4 bytes 4 events of 1 byte

Group (1-8 relays per group) 28 bytes  
7 days of 4 bytes  
Schedule 280 bytes  
10 groups of 28 bytes

Command set

Three digits are available for commands. Each digit can be represented in a binary coded decimal (BCD) notation. . A cellular radio can only hear transmissions that have "even" numbers or "odd" numbers. One bit of this last digit (least significant bit) indicates if the number is even (bit=0) or odd (bit=1). Therefore, this bit can not be used for command or data information, reducing the number of possible commands by two. For example, if a command to turn all groups on is given, this command could be communicated to either of two cellular radios in any given area.

Therefore two 3-digit commands, differing by the least significant bit of the least significant digit are needed to ensure that the same command will be issued regardless of which type of radio happens to be as the recipient of that call. For example, in one embodiment the three digit command of 500 could be the command to turn off all lights for one cellular radio and then, correspondingly, the command 501 (500 and 501 differ by the least



significant bit) would be needed to have the same effect to provide the same operation for a different radio.

The following table summarizes the 3 digit commands that are available in the forward channel direction. Note that some commands require more than a single page in order to implement. Where multiple pages are necessary, the number is specified. In addition, there is a corresponding registration response from the REC. This registration response can be one or more registration messages. Each registration message can be a verification of the information sent in the forward channel direction, or else each registration message can contain data. There may be multiple verification messages or multiple data messages or both.

3-Digit Command No. (Decimal) Even, Odd	Command Name	No. of Forward Channel Pages	Registration Response No. + Type
0X0, 0X1	Turn Group X Off at Time in Bin 1	1	1 - Verification
0X2, 0X3	Turn Group X	1	1 - Verification

	Off at Time in Bin 2		
0X4, 0X5	Turn Group X Off at Time in Bin 3	1	1 - Verification
0X6, 0X7	Turn Group X Off at Time in Bin 4	1	1 - Verification
0X8, 0X9	Turn Group X Off at Time in Bin 5	1	1 - Verification
1X0, 1X1	Turn Group X Off at Time in Bin 6	1	1 - Verification
1X2, 1X3	Turn Group X Off at Time in Bin 7	1	1 - Verification
1X4, 1X5	Turn Group X Off at Time in Bin 8	1	1 - Verification
1X6, 1X7	Turn Group X Off at Time in Bin 9	1	1 - Verification
1X8, 1X9	Turn Group X Off at Time in Bin 10	1	1 - Verification
2X0, 2X1	Turn Group X Off at Time in	1	1 - Verification

	Bin 11		
2X2, 2X3	Turn Group X Off at Time in Bin 12	1	1 - Verification
2X4, 2X5	Turn Group X Off at Time in Bin 13	1	1 - Verification
2X6, 2X7	Turn Group X Off at Time in Bin 14	1	1 - Verification
2X8, 2X9	Turn Group X Off at Time in Bin 15	1	1 - Verification
3X0, 3X1	Turn Group X Off at Time in Bin 16	1	1 - Verification
3X2, 3X3	Turn Group X Off at Time in Bin 17	1	1 - Verification
3X4, 3X5	Turn Group X Off at Time in Bin 18	1	1 - Verification
3X6, 3X7	Turn Group X Off at Time in Bin 19	1	1 - Verification
3X8, 3X9	Turn Group X Off at Time in Bin 20	1	1 - Verification

4X0, 4X1	Clear Schedules Group X	1	1 - Verification
4X2, 4X3	Turn Group X ON Now	1	1 - Verification
4X4, 4X5	Turn Group X Off Now	1	1 - Verification
500, 501	Turn All Groups ON	1	1 - Verification
502, 503	Turn All Groups OFF	1	1 - Verification
504, 505	Set Day of Month for Reporting	2	1 - Verification
508, 509	Initiate Time Schedule	1	1 - Verification
510, 511	Reset Alarms	2	1 - Verification + Data
512, 513	Reset Controller	1	none
520, 521	Read Real-time Clock	1	2 - Verification + Data
522, 523	Set Real-time Clock (YY/MM/DD)	2	1 - Verification
524, 525	Set Real-time Clock (Hours & DST)	2	1 - Verification
526, 527	Set Real-time	2	1 - Verification

	Clock (Minutes)		
530, 531	Read Astronomic Data	1	2 - Verification + Data
532, 533	Set Astronomic Data (Latitude)	2	1 - Verification
534, 535	Set Astronomic Data (Longitude)	2	1 - Verification
536, 537	Set Astronomic Data (Sunset, Sunrise, GMT)	2	1 - Verification
540, 541	Get Radio Status	1	1 - Verification
544, 545	Suspend Radio from Service	1	1 - Verification
546, 547	Restore Radio to Service	1	1 - Verification
548, 549	Get Radio Registration Pass/Fail Count	1	1 - Verification + Data
550, 551	Get Switching Status	1	1 - Verification + Data
552, 553	Get System Port Status	1	1 - Verification + Data
554, 555	Run Diagnostic/Get Status	1	1 - Verification + Data

556, 557	Get DAU Current Mismatch	1	1-3 - Verification + Data
558, 559	Get DAU 1-6 Alarm Status	1	1-6 Verification + Data
560, 561	Set Group Occupant Warn Enable/Disable	2	1 - Verification
562, 563	Test Occupant Warn Output	2	1 - Verification
564, 565	Enable/Disable Motion Sensors	2	1 - Verification
566, 567	Enable/Disable Miscellaneous Flags	2	1 - Verification
570, 571	Set Remote Switches 5-8 to Group X	2	1 - Verification
572, 573	Set Remote Switches 1-4 to Group X	2	1 - Verification
574, 575	Set Relays 5-8 to Group X	2	1 - Verification
576, 577	Set Relays 1-4 to Group X	2	1 - Verification
580, 581	Get Channel 1-8 StartsTotalizat ion	1	4 - Verification + Data
582, 583	Get Channel 1-8	1	8 - Verification

	Manual Mode Totalization		+ Data
584, 585	Get Channel 1-8 Auto Mode Totalization	1	8 - Verification + Data
586, 587	Get Relay 1-8 State + Reason Code	1	3 - Verification + Data
590, 591	Get REC Alarm Status	1	2 - Verification + Data
6XX, 7XX, 8XX, 9XX	Time Schedule Event Change	2	1 - Verification

Message

Figure 23 shows a generic form of a command of a FOCC address page, a FOCC data page, a second FOCC data page and a registration response. A checksum is included in the verification to provide for error detection.

The checksum is the decimal sum of the last three digits of the address page added to the last three digits of the command page added to the last three digits of data page represented as an eight bit value. The result is then converted to a One's Complement and kept as a single 8-bit value.

It is to be understood that there may be one or multiple data pages in the FOCC direction and that

there may be one or multiple data pages in the registration response. This use for communicating data in the RECC direction is known in the art.



What is claimed:

1.

An apparatus for controlling remote devices  
comprising:

5 a central device including a database of events;  
a remote device connected to a resistive or inductive  
electrical load;  
a communications link adapted to communicate data from  
the central device to the remote device related to  
10 an event.

2.

The apparatus of claim 1 wherein the database  
comprises a schedule of events.

3.

15 The apparatus of claim 2 wherein the schedule of  
events is related to operation of the resistive or  
inductive electrical load.

4.

20 The apparatus of claim 1 wherein the central device  
is a computer or network of computers.

5.

The apparatus of claim 1 wherein the remote device  
comprises a digital controller.

6.

25 The apparatus of claim 1 wherein the resistive or  
inductive electrical load comprises a lighting device..

7.

The apparatus of claim 6 wherein the lighting device comprises a wide-area lighting device.

8.

5 The apparatus of claim 7 wherein the wide-area lighting device comprises sports lighting or security lighting.

9.

10 The apparatus of claim 1 wherein the communications link comprises a wide-area communications link.

10.

The apparatus of claim 9 wherein the communications link comprises a wide-area network.

11.

15 The apparatus of claim 1 wherein at least a portion of the communications link is wireless.

12.

The apparatus of claim 11 wherein said wireless portion comprises cellular communication.

20

13.

The apparatus of claim 12 wherein the remote device includes a cellular receiver.

14.

25 The apparatus of claim 1 wherein said data comprises instructions.

15.

The apparatus of claim 14 wherein said instructions include one or more of the set comprising turn on, turn off.

16.

The apparatus of claim 15 wherein said instructions corresponds to a schedule related to time and/or date.

5

17.

The apparatus of claim 1 wherein said communication link is adapted to communicate data from the remote device to the control device.

10

18.

The apparatus of claim 17 wherein said data from the remote device to the control device comprises information.

19.

15 The apparatus of claim 18 wherein said information is related to one or more of the set comprising status related to the resistive or electrical load, and status related to a condition at the location of the resistive or inductive electrical load.

20

20.

The apparatus of claim 1 further comprising a plurality of remote devices, the communications link adapted to communicate data from the central device to the remote devices.

25

21.

The apparatus of claim 1 further comprising a component to revise said database.

22.

The apparatus of claim 21 wherein said component to revise said database comprises a data entry device connected to central device.

5

23.

The apparatus of claim 21 wherein component to revise said database comprises a remote communications device connected to said central device.

10

24.

The apparatus of claim 23 wherein said remote communications device comprises a device which can communicate data to the central device through a communication link.

15

25.

The apparatus of claim 24 wherein the communication link comprises one of the set comprising a wide-area network, and a telephone network.

20

26.

A method for control of remote devices comprising:  
storing in a first location information related to one or more events related to a resistive or inductive electrical load;  
communicating data related to an event from said first location to a second location related to said resistive or inductive electrical load;  
carrying out an action related to the resistive or inductive electrical load at the second location in response to said data.

25

27.

The method of claim 26 further comprising a plurality of resistive or inductive electrical loads positioned at second and other locations.

5

28.

The method of claim 26 wherein said second location is remote from said first location.

29.

10 The method of claim 26 wherein said stored information comprises a schedule of events related to the second location.

30.

15 The method of claim 26 wherein communication of said data is accomplished over a wide-area communications link.

31.

The method of claim 30 wherein the wide-area communications link is at least partly wireless.

20

32.

The method of claim 30 wherein the wireless part is cellular communication.

33.

25 The method of claim 32 wherein the data is communicated over a control channel of the part of the communication link that is cellular communication.

34.

The method of claim 33 wherein the data is contained within a part of a mobile identification number on the control channel.

5

35.

The method of claim 34 wherein the data comprises an instruction related to operation of the resistive or inductive electrical load.

10

36.

The method of claim 35 further comprising a database including an instruction set, the instruction set including individual instructions each communicatable over a unique mobile identification number to the second location.

15

37.

The method of claim 36 wherein a cellular receiver is positioned at the second location to receive the data in the form of a mobile identification number, said cellular receiver configured to respond to one or more mobile identification numbers.

20

38.

The method of claim 26 wherein the resistive or inductive electrical load is a lighting device.

25

39.

The method of claim 38 wherein the lighting device is a sports lighting device or security lighting device.

40.

The method of claim 39 wherein the sports lighting device comprises a plurality of sports lighting lights, each comprising a resistive or inductive electrical load.

5

41.

The method of claim 40 wherein the plurality of sports lights can be located at a second location or multiple locations.

42.

10

The method of claim 26 further comprising revising the stored information from time to time.

43.

15

The method of claim 26 further comprising communicating data from the second location to the first location.

44.

20

The method of claim 43 wherein the data from the second location to the first location comprise information regarding status of the resistive or inductive electrical load, or a condition related to the resistive or inductive electrical load or second location.

45.

25

A system for control of remote electric devices comprising:  
a central control including a computer, a memory in operative communication with the computer, and a database stored in said memory;

a set of remote controllers each operatively connected to one or more resistive or inductive electrical loads; a communications link adapted to communicate between said central control and said remote controllers.

5 46.

The system of claim 45 wherein said database comprises schedules related to operation of said resistive or inductive electrical loads.

47.

10 The system of claim 45 wherein said resistive or inductive electrical loads comprise lighting devices.

48.

The system of claim 45 wherein the lighting devices are sports lights or security lighting.

15 49.

The system of claim 45 wherein said communications link, at least in part, comprises a cellular network.

50.

20 The system of claim 49 wherein said communication link carries data over a control channel of cellular network.

51.

25 The system of claim 50 wherein said data relates to instructions regarding the operation of the resistive or inductive electrical loads.



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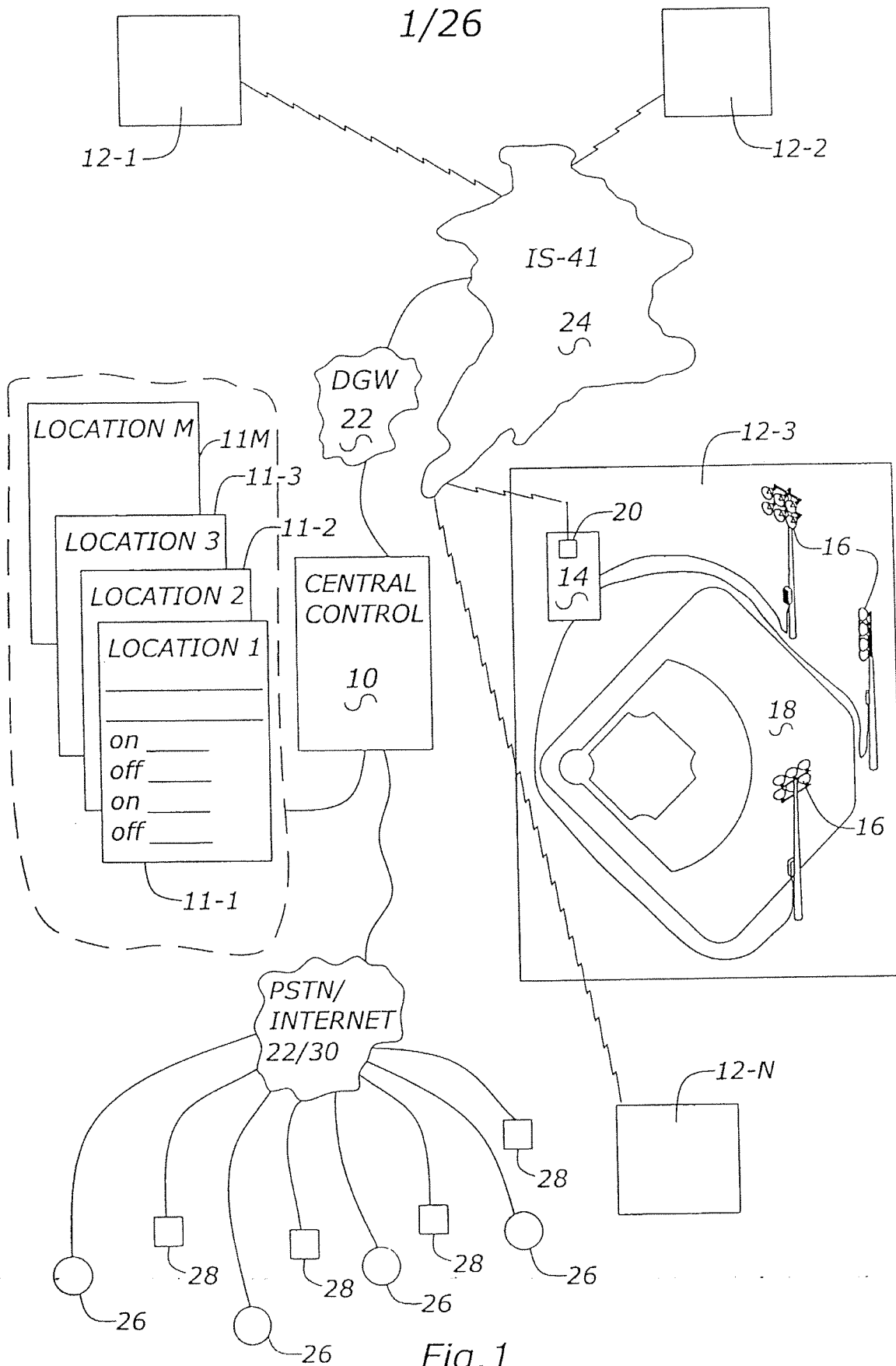
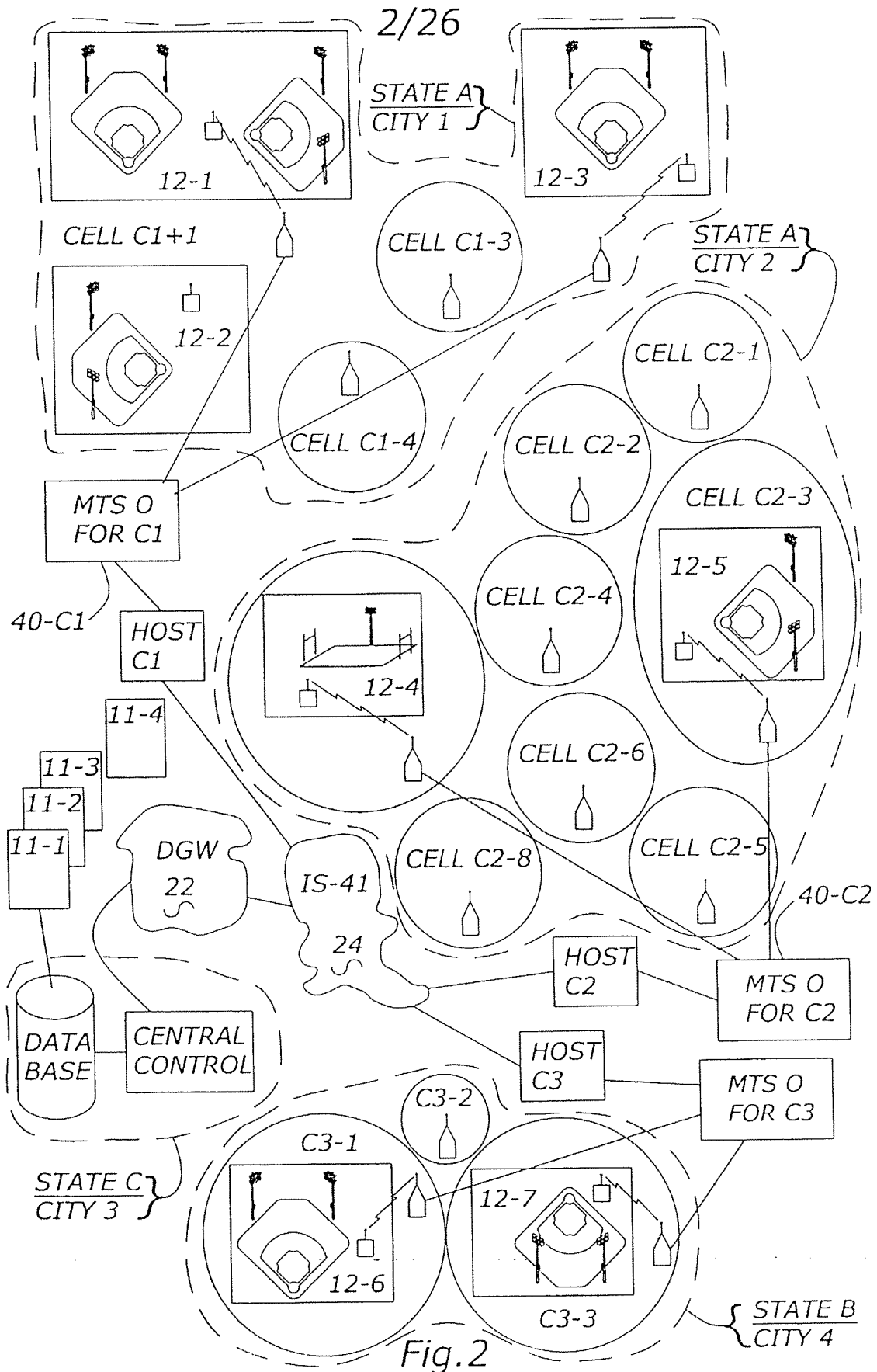


Fig. 1



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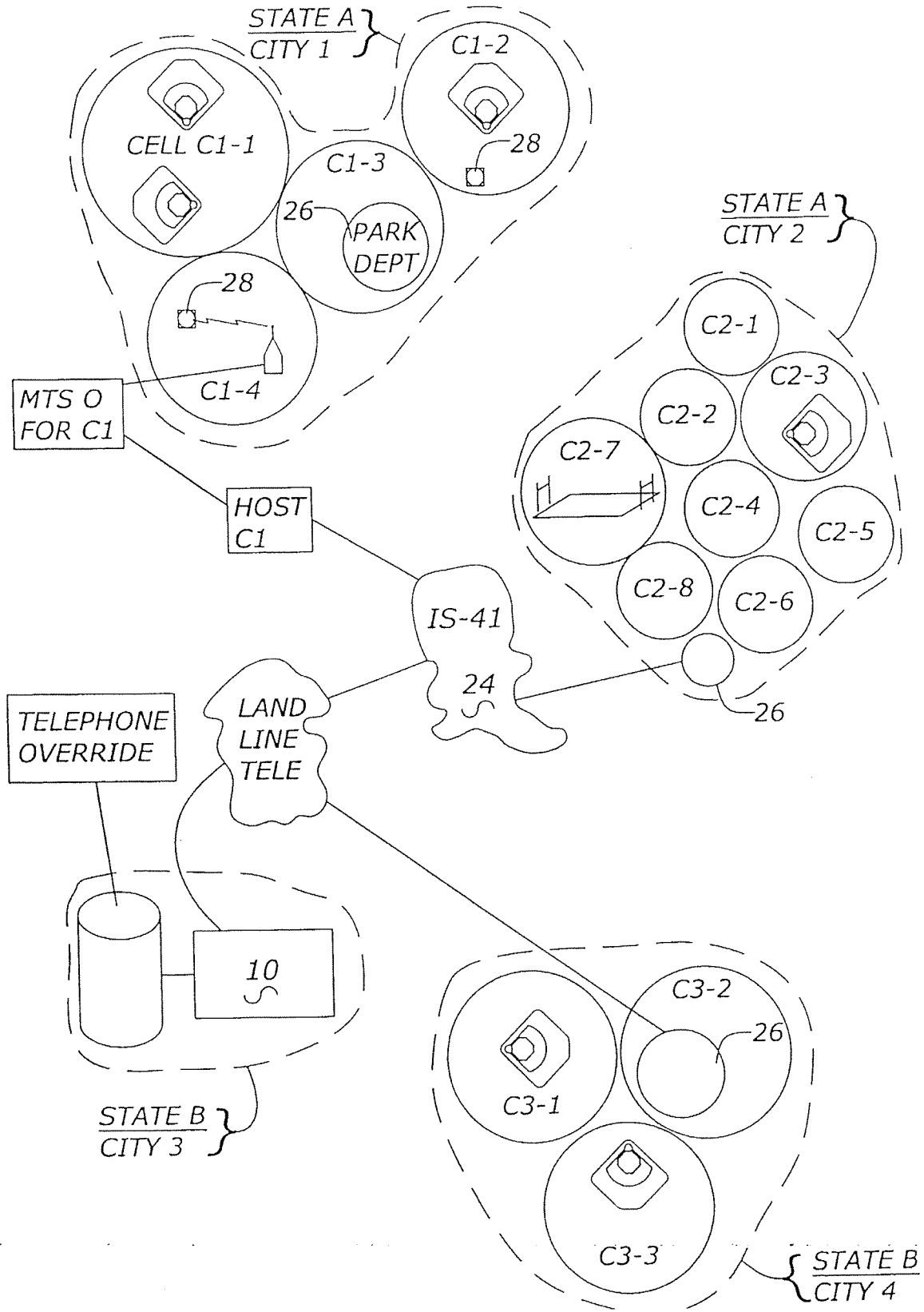


Fig.3

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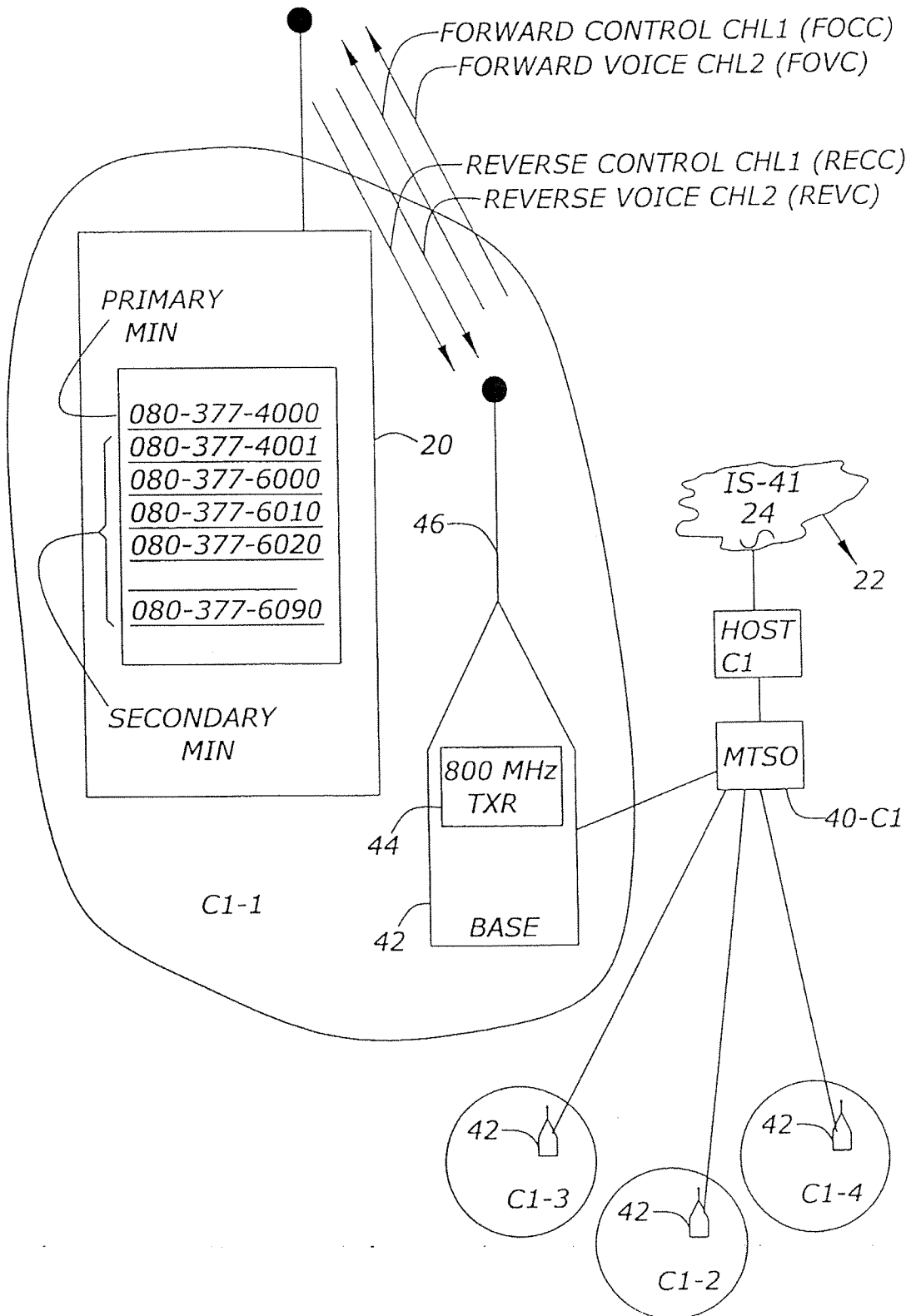


Fig.4

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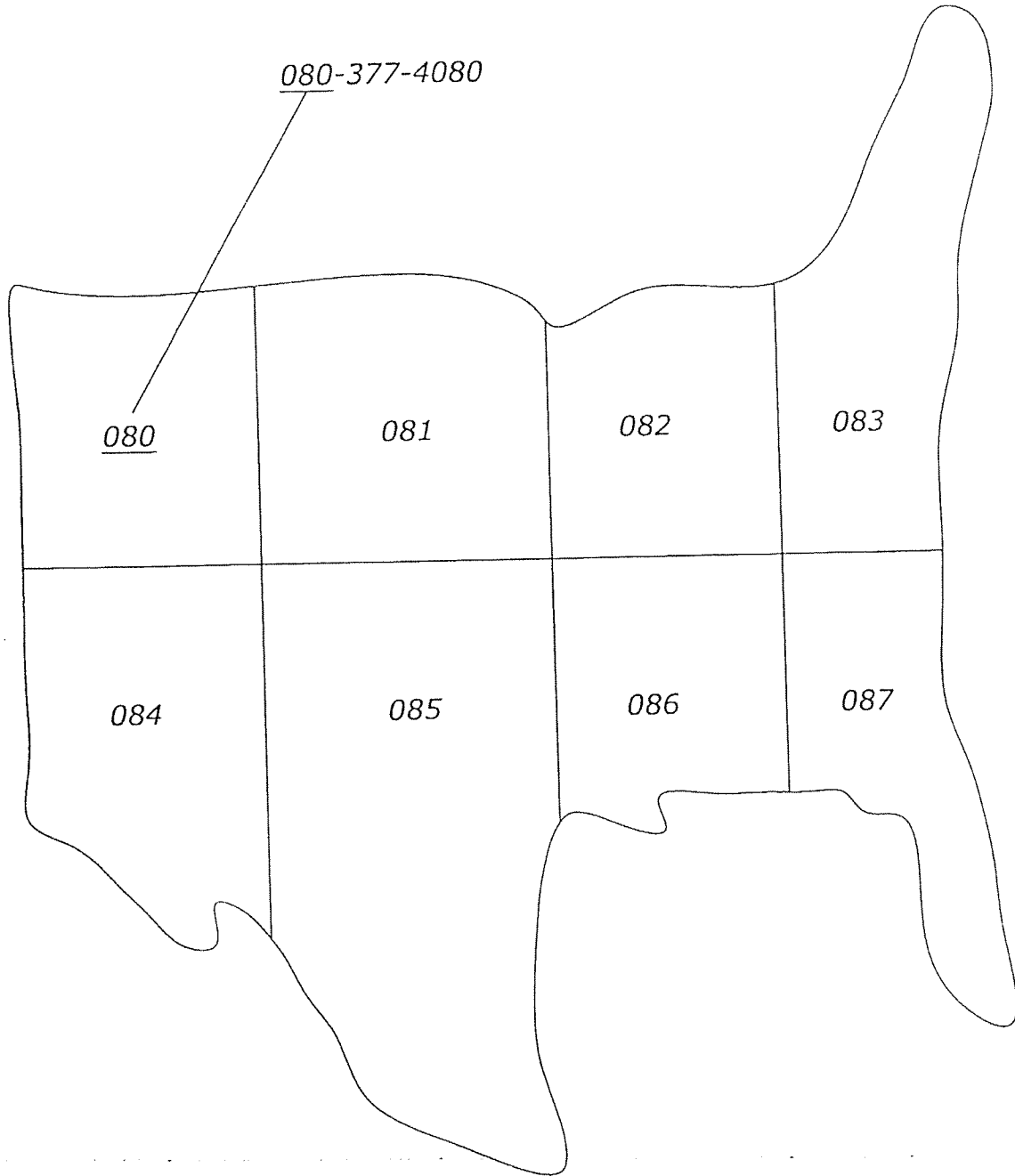


Fig.5

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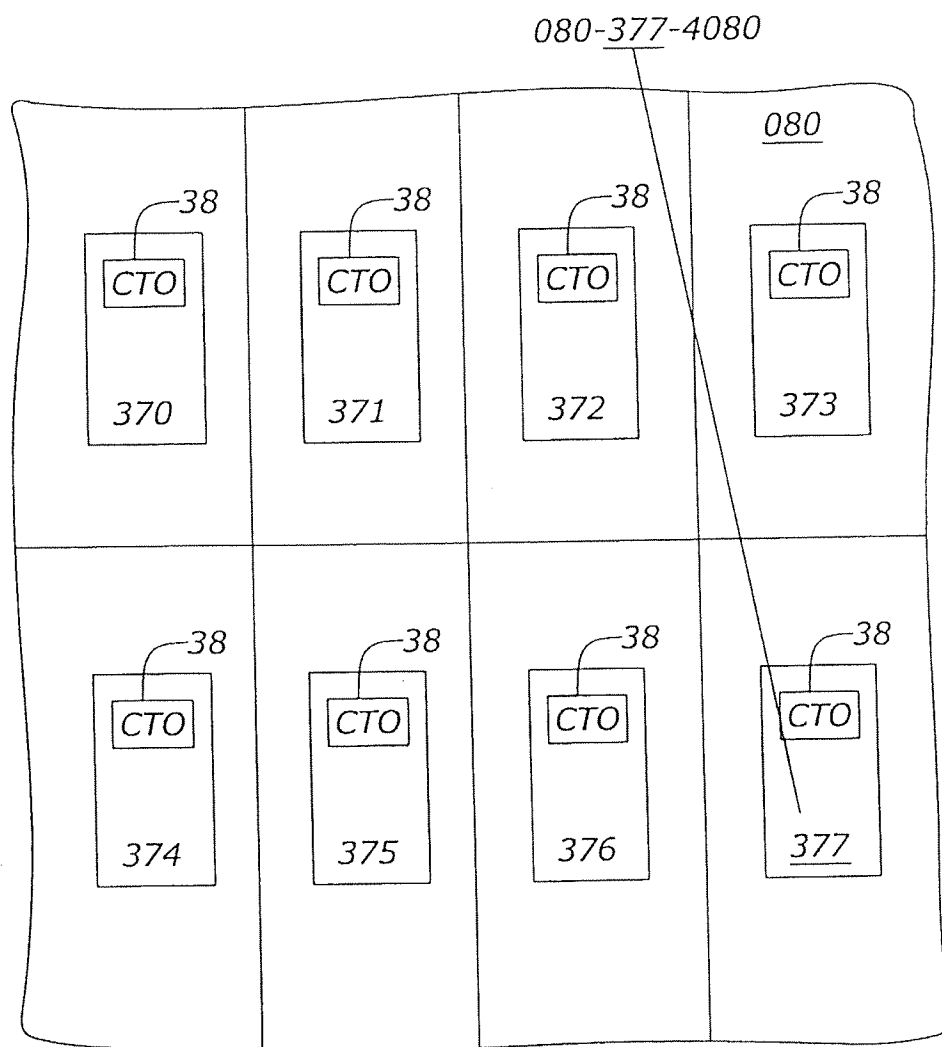


Fig. 6

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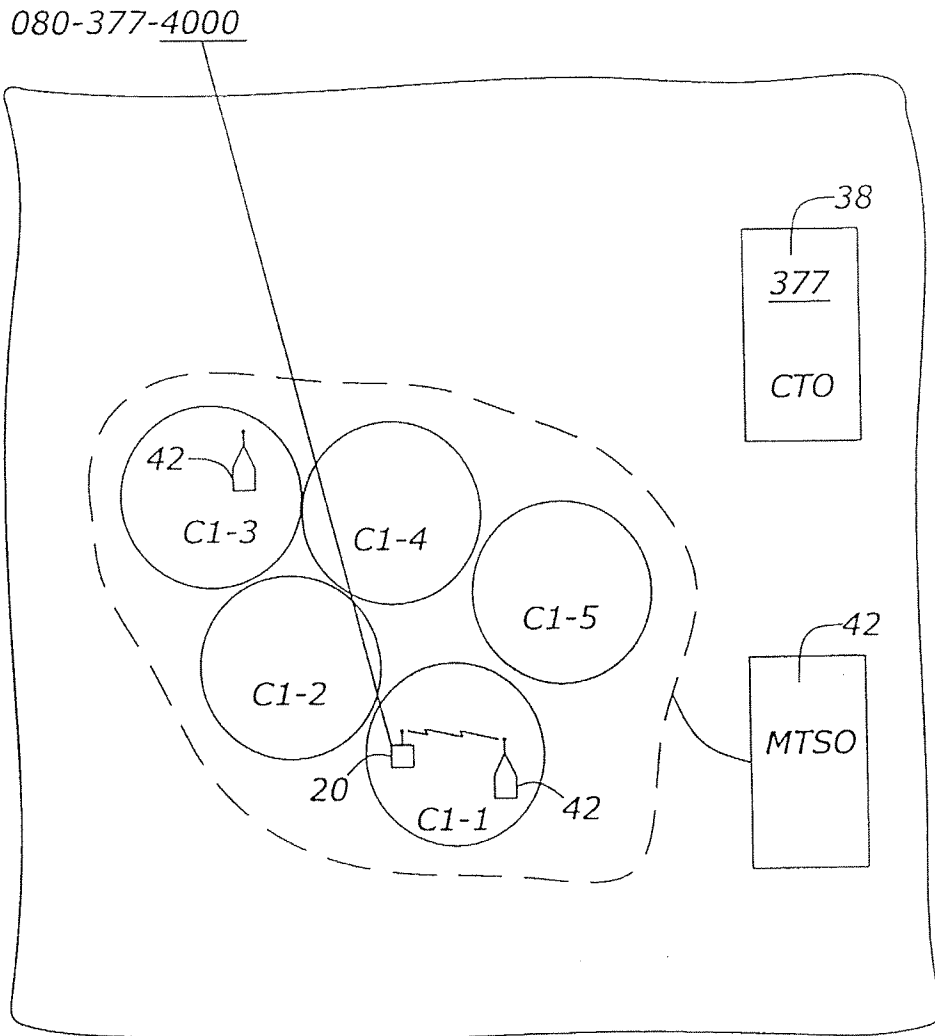
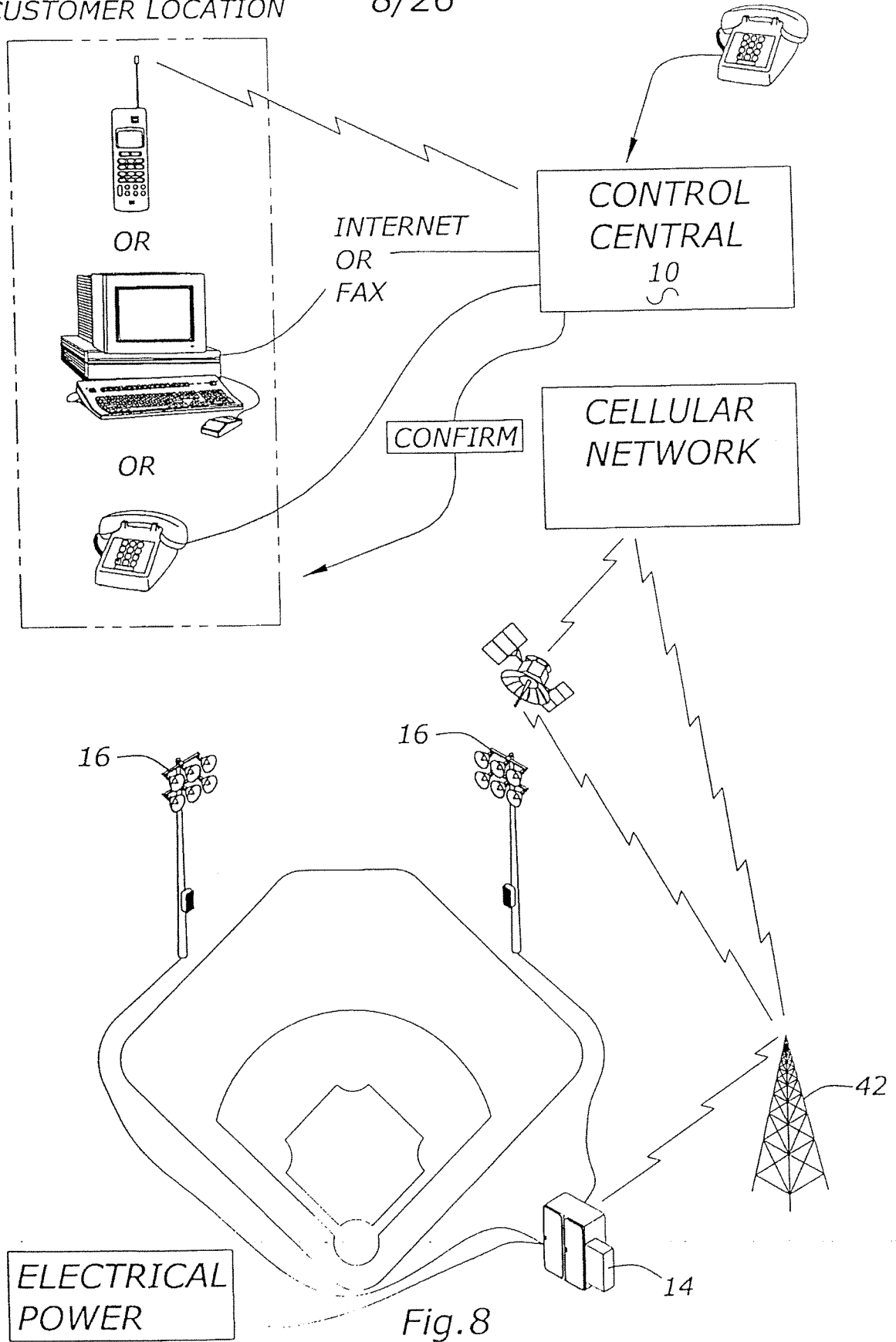


Fig. 7

CUSTOMER LOCATION 8/26





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CONTROL-LINK FLOW

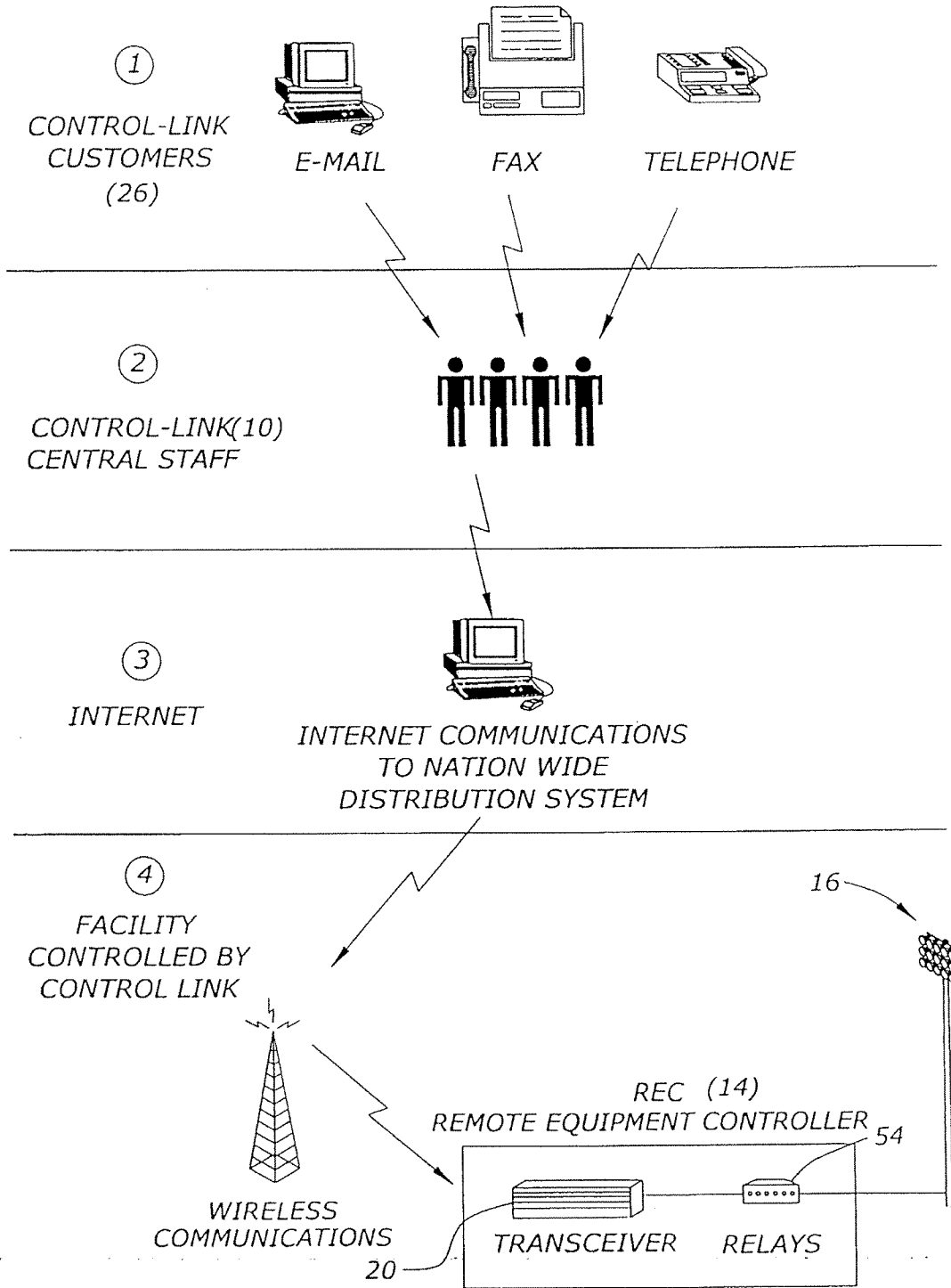


Fig. 8B

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CONTROL-LINK FLOW

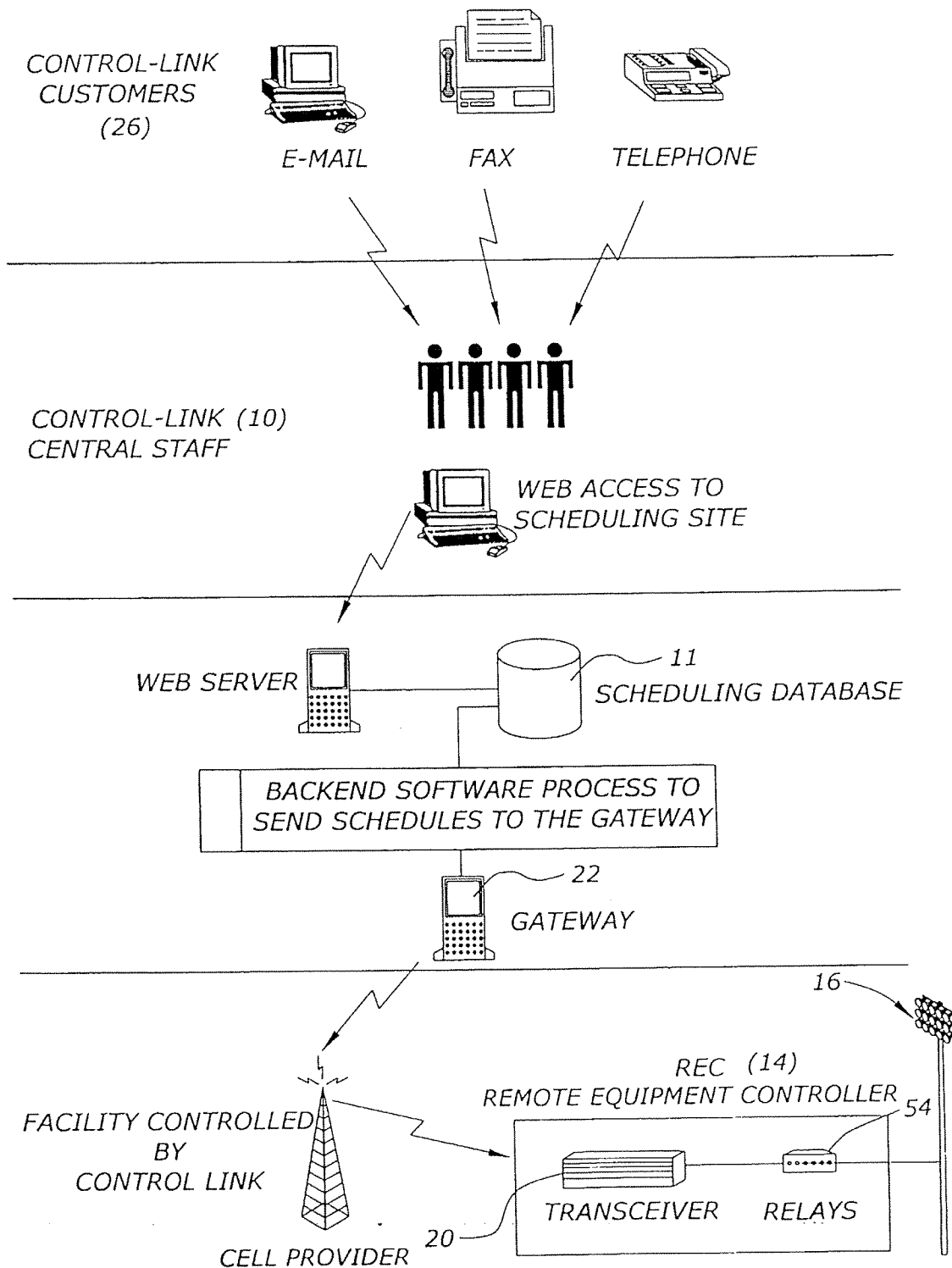


Fig.8C

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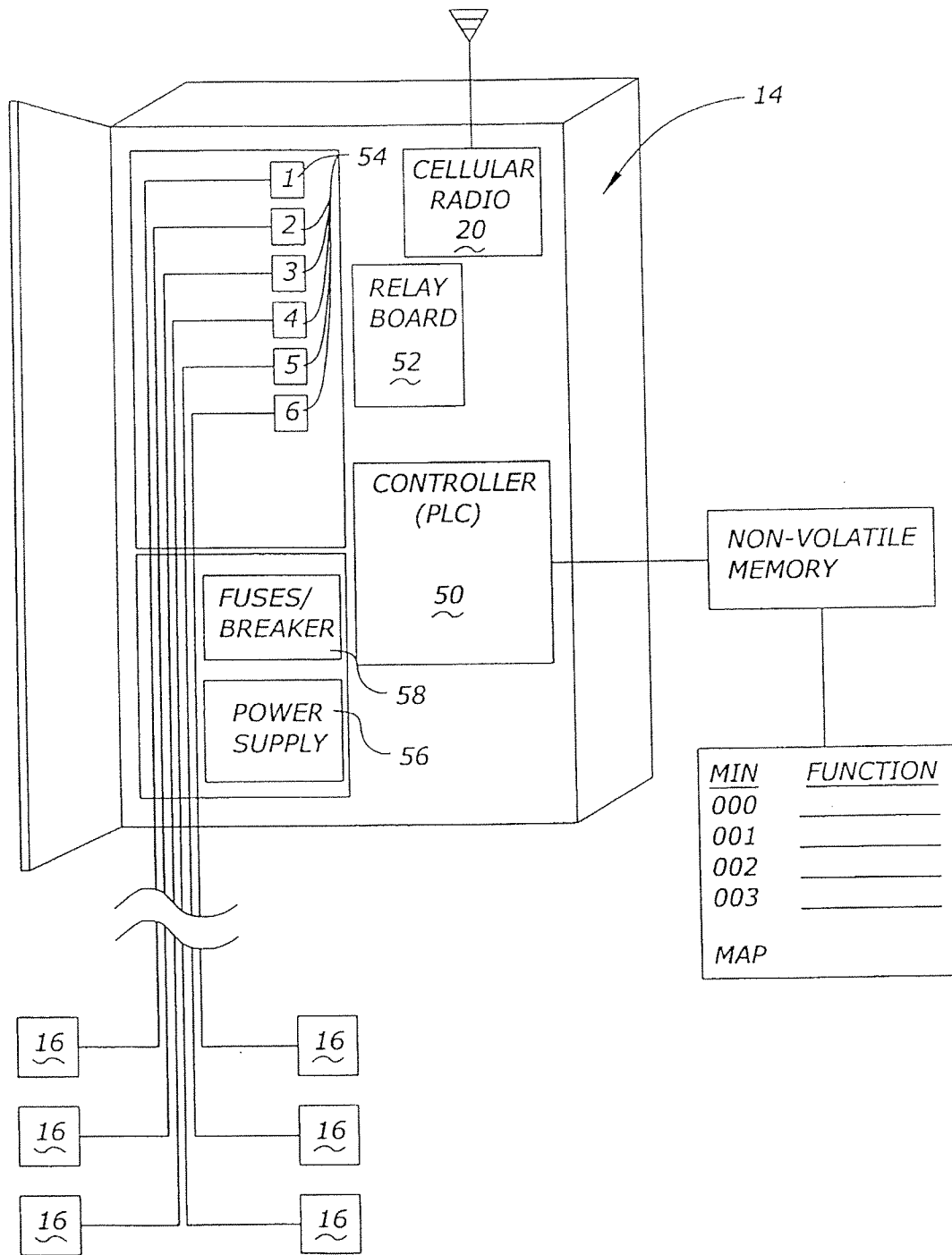


Fig.9

SUBSTITUTE SHEET (RULE 26)

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### REMOTE EQUIPMENT CONTROLLER (REC)

- COMPLETELY ASSEMBLED AND TESTED
- ONLY 3 ELECTRONIC ASSEMBLIES
- BUILT-IN DIAGNOSTICS AND TEST BUTTONS

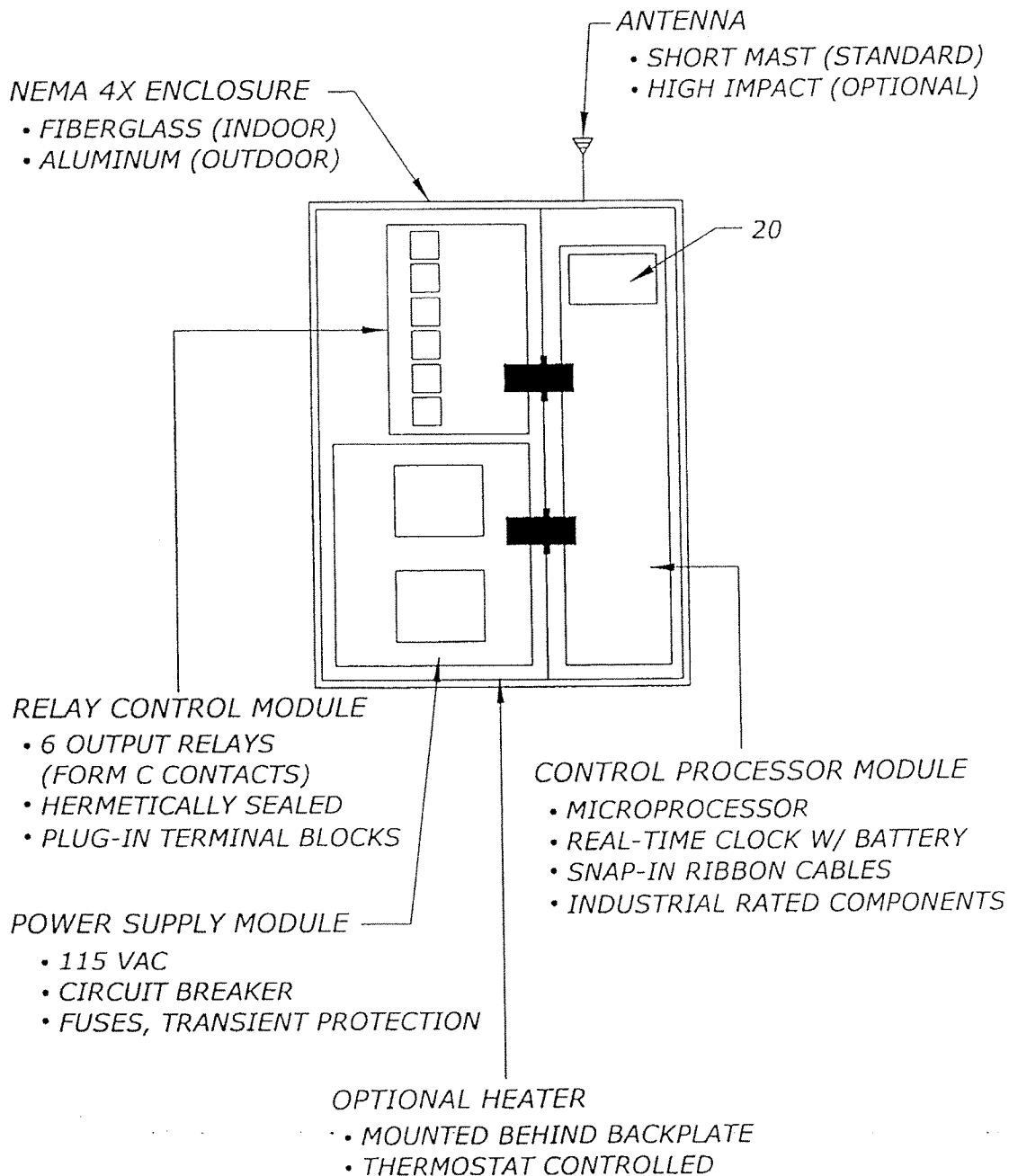


Fig.9B

13/26

SCHEDULE

STATE A, CITY 1

LOCATION: TWIN PEAK PARK

<u>LIGHTING ZONE</u>	<u>ON TIME</u>	<u>OFF TIME</u>
SOFTBALL INFIELD	18:00	22:30
SOFTBALL OUTFIELD	18:15	22:15
SOCCER FIELD	17:00	6:00
SECURITY LIGHTS	19:00	19:00

Fig.10

SUBSTITUTE SHEET (RULE 26)

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REC WIRING DATA

LOCATION (FIELD, BALLFIELD): \_\_\_\_\_

REMOTE EQUIPMENT CONTROLLER: \_\_\_\_\_

RELAY	CONTROL ZONE	POLES	CONTRACTORS	DEFAULT STATE
1				
2				
3				
4				
5				
6				

Fig. 11

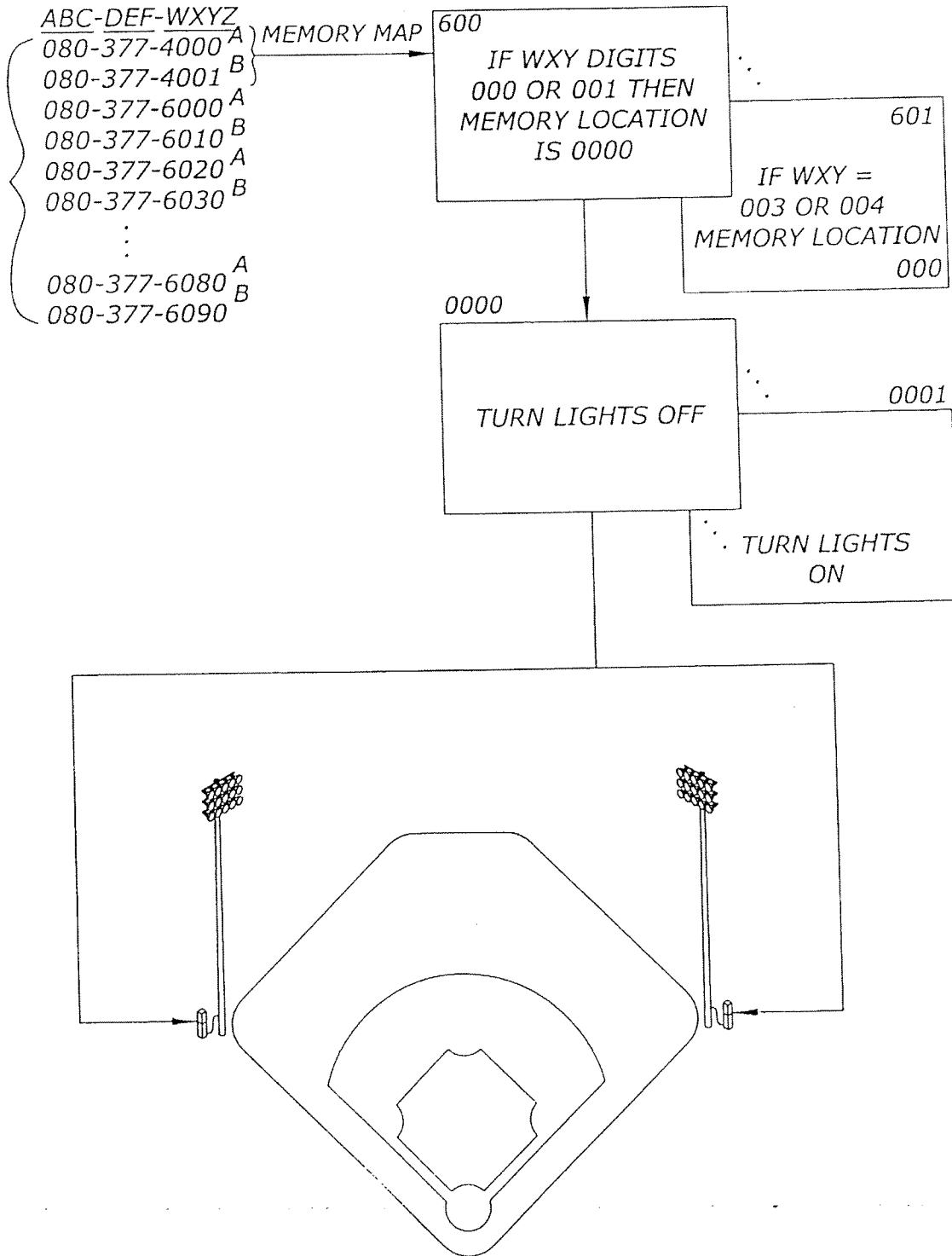


Fig. 12

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LOGIN

APPLICATION ID	
PASSWORD	
<input type="button" value="LOGIN"/>	

Fig.13



17/26

MENU

<i>NEW LOGIN</i>
<i>ACTIVATE NEW UNIT</i>
<i>DEACTIVATE UNIT</i>
<i>NOTIFICATION STRATEGIES</i>
<i>ESN DATA DECODING</i>
<i>UNIT CONFIGURATION</i>
<i>VIEW UNIT REGISTRATIONS</i>
<i>VIEW UNIT NOTIFICATIONS</i>
<i>PROGRAM UNIT</i>
<i>OUTPUT CONTROL</i>
<i>1601 SACI DOCS</i>

Fig.14

18/26

OUTPUT CONTROL

MENU | UNIT NUMBER  | REFRESH |

| SEND |

IMMEDIATE CONTROL

	ON	OUTPUT	1	2	3	4	5	6	7	8
	OFF	STATE								

SCHEDULE: UNDEFINED

Row#	Mnth	Day	Once	Hr	Min	M	T	U	W	T	H	F	R	S	A	S	U	Op1	Op2	Op3	Op4	Op5	Op6	Op7	Op8
2	✓	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="text" value="11"/>	<input type="text" value="10"/>	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	✓								
1	✓	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="text" value="11"/>	<input type="text" value="16"/>	X	X	X	✓	X	X	X	X	X	X	X								

CLICK CELL IMAGE TO TOGGLE SETTING. CLICK "REC"

CELL IMAGE TO DELETE RECORD.

Fig.15

19/26

OOOO

MUSCO CONTROL-LINK SCHEDULER

- INSTRUCTIONS: 1: FOLLOW INSTRUCTIONS 1-4 BELOW.  
 2. WHEN COMPLETED EMAIL THIS FORM TO SCHEDULE @ MUSCO OR FAX TO 800-XXX-YYYY  
 \*IF YOU HAVE ANY QUESTIONS OR PROBLEMS CALL CONTROL-LINK CENTRAL DIRECTLY AT 877-XXX-YYYY

CUSTOMER NAME: CITY OF BARTLETT

CUSTOMER NUMBER: XYZ

CITY & STATE: BARTLETT TN.

1. FILL IN USERCODE, PASSWORD AND FACILITY.

USERCODE:

PASSWORD:

FACILITY:

2. IF YOU WOULD LIKE YOUR CONFIRMATION SENT DIFFERENTLY THAN INDICATED BELOW, PLEASE LET US KNOW HOW YOU WOULD LIKE YOUR CONFIRMATION SENT, I.E., PHONE, EMAIL OR FAX.

SEND BACK CONFIRMATION OF THE SCHEDULE TO:

3: ESTABLISHED WEEKLY SCHEDULES. (THESE OCCUR WEEKLY BY DEFAULT) BEGINS WEEK OF:

ZONE REQ'D.	MON.		TUES.		WED.		THURS.		FRI.		SAT.		SUN.	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF

4. FILL ANY EXCEPTION SCHEDULING NEEDS WHICH ARE DIFFERENT THAN YOUR OWN FIXED SCHEDULE.

ZONE	START DATE	START TIME	END DATE	END TIME

NOTE: LACK OF REQUIRED INFORMATION WILL DELAY THE IMPLEMENTATION OF YOUR SCHEDULE.

Fig.16

20/26

MUSCO LIGHT ZONE INFORMATION FORM

CITY: [REDACTED] STATE: [REDACTED]

TIME ZONE: [REDACTED]

DAYLIGHT SAVINGS TIME Y/N: [REDACTED]

FACILITY NAME: [REDACTED]

UNIT/REC NUMBER: [REDACTED]

RELAY 1 DESCRIPTION: [REDACTED]

RELAY 2 DESCRIPTION: [REDACTED]

RELAY 3 DESCRIPTION: [REDACTED]

RELAY 4 DESCRIPTION: [REDACTED]

RELAY 5 DESCRIPTION: [REDACTED]

RELAY 6 DESCRIPTION: [REDACTED]

CUSTOMER LIGHT ZONES:  
DESCRIPTION

RELAYS



SCHEDULE INFORMATION:

Fig.17

21/26

MUSCO CONTROL-LINK CUSTOMER INFORMATION FORM

CUSTOMER INFORMATION

NAME:

ADDRESS 1:

ADDRESS 2:

CITY:

STATE:

ZIP:

PHONE:

FAX:

MAIN CONTACT INFORMATION

MAIN CONTACT NAME:

DAY PHONE:

NIGHT PHONE:

CELL PHONE:

PAGER:

Fig. 18

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MUSCO CONTROL-LINK FACILITY INFORMATION FORM

CUSTOMER NAME:

(PARK) USER NAME:

ADDRESS 1:

ADDRESS 2:

CITY:

STATE:

ZIP:

PHONE:

EMERGENCY CONTACT INFORMATION

EMRGENCY CONTACT NAME:

PHONE:

TIME INFORMATION:

TIME ZONE:

DAY LIGHT SAVINGS TIME Y/N:

Fig.19

23/26

MUSCO CONTROL-LINK SCHEDULER INFORMATION FORM

CUSTOMER NAME:

(PARK) USER NAME:

ADDRESS 1:

ADDRESS 2:

CITY:

STATE:

ZIP:

PHONE:

CELL PHONE

FAX:

EMAIL:

PAGER:

USERCODE:

PASSWORD:

FACILITIES (PARKS) THEY ARE ALLOWED TO SCHEDULE:

Fig.20

24/26

MUSCO CONTROL-LINK USER INFORMATION FORM

CUSTOMER NAME:

(PARK) USER NAME:

ADDRESS 1:

ADDRESS 2:

CITY:

STATE:

ZIP:

PHONE:

FAX:

EMAIL:

MAIN CONTACT NAME:

FACILITIES (PARKS) THEY ARE ALLOWED TO SCHEDULE:

Fig.21

SUBSTITUTE SHEET (RULE 26)



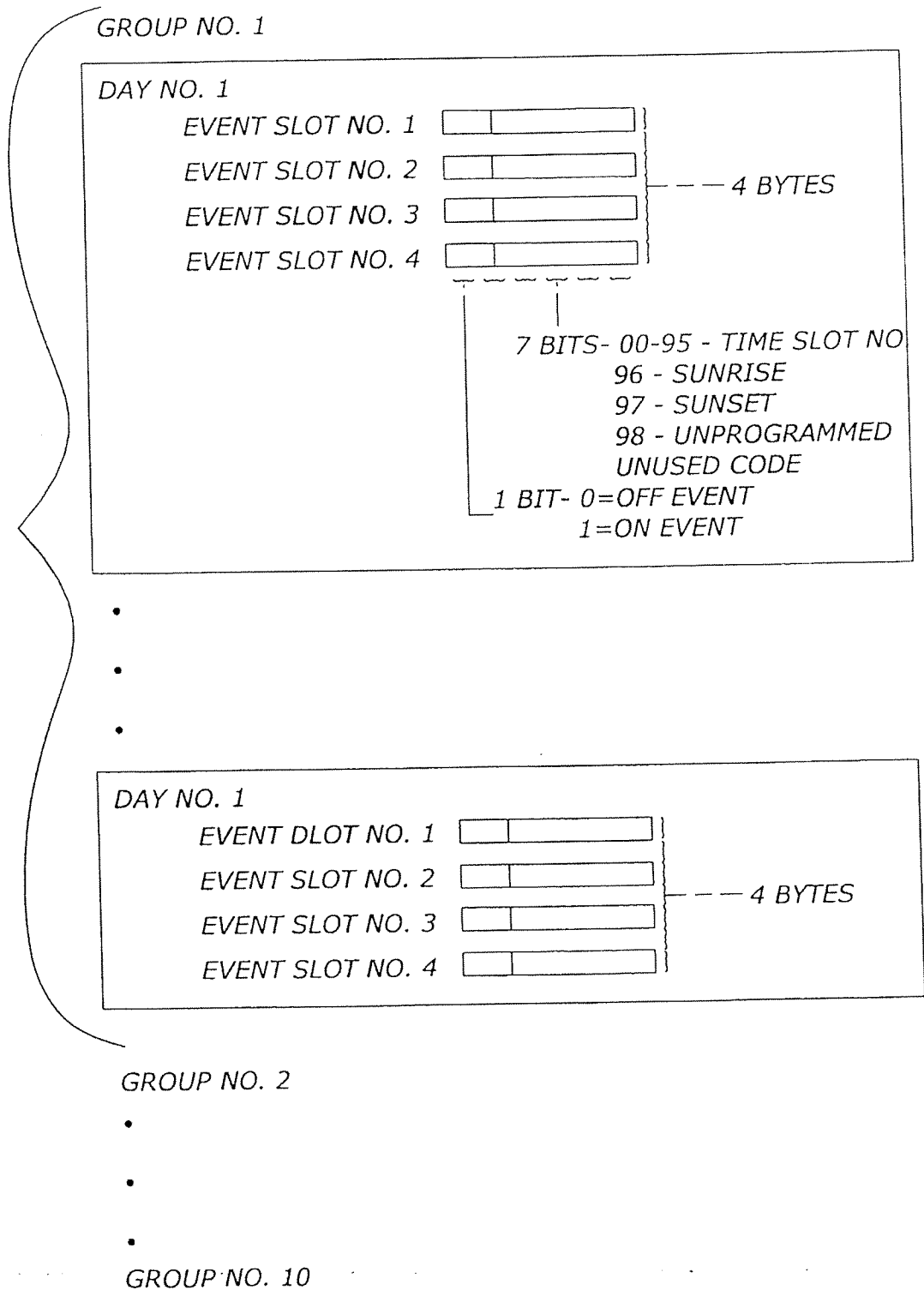


Fig.22



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/18242

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 H04M11/00

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M H04Q

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

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

EPO-Internal, WPI Data, PAJ, INSPEC

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 38540 A (AERIS COMMUNICATIONS INC ;LADUE CHRISTOPH KARL (US)) 16 October 1997 (1997-10-16) page 10, line 25 -page 11, line 20 page 17, line 33 -page 21, line 22 page 25, line 36 -page 28, line 6 -----	1-51
P, X	WO 99 60769 A (CELLEMETRY LLC) 25 November 1999 (1999-11-25) page 21, line 8 -page 24, line 14 page 30, line 18 -page 33, line 35 page 36, line 11 -page 37, line 17 -----	1-51

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

17 October 2000

Date of mailing of the international search report

23/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

López-Pérez, M-C

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/18242

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9738540 A	16-10-1997	AU 702270 B	18-02-1999
		AU 5448996 A	29-10-1997
		BR 9611953 A	25-05-1999
		EP 0894407 A	03-02-1999
		JP 11510976 T	21-09-1999
		CA 2240280 A	16-10-1997
		US 5999808 A	07-12-1999
WO 9960769 A	25-11-1999	AU 4089799 A	06-12-1999

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	11329212			
<b>Filing Date:</b>	10-Jan-2006			
<b>Title of Invention:</b>	Programmable communicator			
First Named Inventor/Applicant Name:	Eveline Wesby Van Swaay			
<b>Filer:</b>	Jonathan Lovely			
<b>Attorney Docket Number:</b>	1503/105			
Filed as Small Entity				
<b>Utility Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	2202	30	25	750
Independent claims in excess of 3	2201	1	105	105
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
Extension - 1 month with \$0 paid	2251	1	60	60
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>1095</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	2529835
<b>Application Number:</b>	11329212
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	6667
<b>Title of Invention:</b>	Programmable communicator
<b>First Named Inventor/Applicant Name:</b>	Eveline Wesby Van Swaay
<b>Customer Number:</b>	2101
<b>Filer:</b>	Jonathan Lovely
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	1503/105
<b>Receipt Date:</b>	30-NOV-2007
<b>Filing Date:</b>	10-JAN-2006
<b>Time Stamp:</b>	14:57:12
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1095
RAM confirmation Number	183
Deposit Account	194972
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment - After Non-Final Rejection	klw1503105_amdt.pdf	190506	no	16
			90ecc64bf5943dc5c614803dac51ded48228a137		
<b>Warnings:</b>					
<b>Information:</b>					
2	Information Disclosure Statement (IDS) Filed	klw1503105_ids.pdf	271200	no	6
			dec82969fd737122d0dd30f746e2a9d7e7d79f5		
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	klw1503105_refBD.pdf	1579014	no	30
			226201b93562040f4f6dfcea4fbc090faf2d1b0f		
<b>Warnings:</b>					
<b>Information:</b>					
4	Foreign Reference	klw1503105_refBE.pdf	1395304	no	22
			6e33bd667618a29238c1694c4bcb9cd144ef8594		
<b>Warnings:</b>					
<b>Information:</b>					
5	Foreign Reference	klw1503105_refBF.pdf	1808673	no	30
			f43b598016f151950a9d7ecfb70c2fd6bdaa2de9		
<b>Warnings:</b>					
<b>Information:</b>					
6	Foreign Reference	klw1503105_refBG.pdf	7904233	no	208
			24259c62235de14f274a39dc7011440fc1695f12		
<b>Warnings:</b>					
<b>Information:</b>					
7	Fee Worksheet (PTO-06)	fee-info.pdf	8547	no	2
			6d1ecc390f69d836741bf3962e45501937dd7122		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			13157477		



This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/329,212</b>	Filing Date <b>01/10/2006</b>	<input type="checkbox"/> To be Mailed
---	---	----------------------------------	---------------------------------------

APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	SMALL ENTITY <input checked="" type="checkbox"/>	OR		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =		X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>						
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT	11/30/2007	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 50	Minus ** 20	= 30	X \$25 =	750	OR X \$ =	
	Independent (37 CFR 1.16(h))	* 4	Minus *** 3	= 1	X \$105 =	105	OR X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR	
					TOTAL ADD'L FEE	<b>855</b>	OR	TOTAL ADD'L FEE

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	X \$ =		OR X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X \$ =		OR X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
**LASHONNAH R. TYSON**

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/329,212	01/10/2006	Eveline Wesby Van Swaay	1503/105	6667

2101 7590 08/03/2007  
BROMBERG & SUNSTEIN LLP  
125 SUMMER STREET  
BOSTON, MA 02110-1618

EXAMINER

NGUYEN, NAM V

ART UNIT PAPER NUMBER

2612

MAIL DATE DELIVERY MODE

08/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 11/329,212	Applicant(s) VAN SWAAY, EVELINE WESBY	
	Examiner Nam V. Nguyen	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 10 January 2006.
- 2a)  This action is FINAL.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-20 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-19 is/are rejected.
- 7)  Claim(s) 20 is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 10 January 2006 is/are: a)  accepted or b)  objected to by the Examiner.
  - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some \*    c)  None of:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892) ✓
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08) ✓  
Paper No(s)/Mail Date 11/03/06; 4/17/06
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_

### DETAILED ACTION

The application of Van Swaay for a “programmable communicator” filed January 10, 2006 has been examined.

This application claims foreign priority based on the application 20001239 filed May 23, 2000 in Finland. Receipt is acknowledged of papers submitted under 35 U.S.C 119(a) – (d), which papers have been placed of record in the file.

This application is a CON of 10/296,571 filed January 21, 2003 which is abandoned which is a 371 of PCT/EP01/05738 filed May 18, 2001.

Claims 1-20 are pending.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgstahl et al. (US# 6,424,623) in view of Anderson (US# 5,995,603).

Art Unit: 2612

Referring to claims 1 and 11, Borgstahl et al. disclose a method and a programmable communicator device (20) (i.e. a peer) (column 3 lines 26 to 30; see Figures 1 and 2), the device (20) comprising: a wireless communications circuit (38), including an antenna (36), configured to receive a transmission (26);

an identity module (42) (i.e. a memory) having a unique identifier (68) (i.e. an authorization key) (column 5 lines 7 to 18; column 6 lines 44 to 55; see Figures 2 and 7);

a processing module (40) including program code (50) configured to determine if the transmission is from an authenticated caller by determining whether a received transmission contains the unique identifier (column 5 lines 10 to 22; column 7 line 58 to column 8 line 9; see Figures 2 and 6).

However, Borgstahl et al. did not explicitly disclose memory configured to store telephone numbers or IP addresses received in transmissions from an authenticated caller.

In the same field of endeavor of programming an incoming telephone call, Anderson teaches that memory (52) configured to store telephone numbers received in transmissions from an authenticated caller (column 3 lines 50 to 67; see Figures 1 and 3) in order to control the operation of the system and input information into the system.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize using memory to store telephone number received from authorized caller taught by Anderson in a two way wireless link of peer device of Borgstahl et al. because having memory to store telephone numbers received in transmissions from authorized caller would improve operation of the peer device after establishing the two-way personal communication network.

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Referring to Claims 2 and 12, Borgstahl et al. in view of Anderson disclose the programmable communicator device according to Claims 1 and 11, Anderson discloses wherein the processing module is further configured to terminate calls from numbers not stored in memory (column 6 lines 46 to 53; see Figure 6).

Referring to Claims 3 and 13, Borgstahl et al. in view of Anderson disclose the programmable communicator device according to Claims 1 and 11, Anderson discloses wherein the wireless communication circuit further comprises an auto answer module configured to automatically answer incoming calls (column 6 lines 39 to 45; see Figure 6).

Referring to Claims 4-5 and 14, Borgstahl et al. in view of Anderson disclose the programmable communicator device according to Claims 2 and 12, Anderson discloses wherein the wireless communication circuit further comprises a ringing tone generator and wherein the processing module is further configured to allow the ringing tone generator to ring for incoming calls from numbers stored in memory (column 4 lines 59 to column 5 line 13).

Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgstahl et al. (US# 6,424,623) in view of Anderson (US# 5,995,603) as applied to Claims 1 and 11, and further in view of Hegeman (US# 5,884,161).

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Referring to Claims 6 and 15, Borgstahl et al. in view of Anderson disclose the programmable communicator device according to Claims 1 and 11, however, Borgstahl et al. in view of Anderson did not explicitly disclose an associated monitoring device linked to the programmable communicator device to permit relaying of data from the linked monitoring device to one or more of the telephone numbers or IP addresses stored in the memory.

In the same field of endeavor of programming an incoming telephone call, Hegeman teaches an associated monitoring device (17) linked to the programmable communicator device (19) to permit relaying of data from the linked monitoring device (17) to one or more of the telephone numbers stored in the memory (45) (column 11 lines 3 to 37) in order to transmit code signal to the terminal using links associated with a signaling network.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize having a terminal linked to the receiving device to permit data exchange to one of the telephone number in the memory of the receiving device taught by Hegeman in a two way wireless link of peer device of Borgstahl et al. in view of Anderson because having a terminal linked to the receiving device to permit data exchange to one of the telephone number in the memory of the receiving device would improve operation of the peer device after establishing the two-way personal communication network.

Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgstahl et al. (US# 6,424,623) in view of Anderson (US# 5,995,603) and Hegeman (US# 5,884,161) as applied to Claims 6 and 15, and further in view of Murray et al. (US# 5,831,545).



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Referring to Claims 7 and 16, Borgstahl et al. in view of Anderson and Hegeman disclose the programmable communicator device according to Claims 6 and 15, however, Borgstahl et al. in view of Anderson and Hegeman did not explicitly disclose a locating system configured to monitor the location of the monitoring device and store the location information in the memory.

In the same field of endeavor of programming in a mobile device, Murray et al. teach a locating system (12) configured to monitor the location of the monitoring device (10) and store the location information in the memory (20) (column 6 lines 3 to 28; see Figure 2) in order to determine the best transmission strategy for reducing the unacceptable level of error.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize having a memory to store the location of the selective call radio using the GPS system taught by Murray in a two way wireless link of peer device of Borgstahl et al. in view of Anderson and Hegeman because having a GPS system to determine the location of the selective call radio and stored the location in memory would improve operation of the peer device after establishing the two-way personal communication network by reducing the level of error.

Claims 8-9 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgstahl et al. (US# 6,424,623) in view of Anderson (US# 5,995,603) and Hegeman (US# 5,884,161) as applied to Claims 6 and 15, and further in view of Swanson et al. (US# 5,689,442).

Referring to Claims 8-9 and 17-18, Borgstahl et al. in view of Anderson and Hegeman disclose the programmable communicator device according to Claims 6 and 15, however,

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Borgstahl et al. in view of Anderson and Hegeman did not explicitly disclose a sensor configured to monitor a condition of the monitoring device and prompt the programmable communicator to repeatedly call at least one of the stored telephone numbers or IP addresses when a threshold is reached.

In the same field of endeavor of programming in a mobile device, Swanson et al. teach a an environment sensor (16) configured to monitor a condition of the monitoring device (100) and prompt the programmable communicator (100) to dial to a remote locations to report the occurrence of detected events of interest automatically (column 9 line 59 to column 10 line 8) in order to improve functionality of the surveillance system.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize using a sensor to detect environment of interest to send to a remote location automatically taught by Swanson in a two way wireless link of peer device of Borgstahl et al. in view of Anderson and Hegeman because having a sensor to detect environmental sensing event call the remote location would improve operation of the peer device.

Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borgstahl et al. (US# 6,424,623) in view of Anderson (US# 5,995,603) and Hegeman (US# 5,884,161) as applied to Claims 6 and 15, and further in view of Akiyama et al. (US# 5,745,049).

Referring to Claims 10 and 19, Borgstahl et al. in view of Anderson and Hegeman disclose the programmable communicator device according to Claims 6 and 15, however, Borgstahl et al. in view of Anderson and Hegeman did not explicitly disclose wherein

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the wireless communication circuit is further configured to receive at least one digital command; and the monitoring device is further configured to read the at least one digital command, execute a task in response to said digital command, measure physical or process status data, and store measured data into the memory.

In the same field of endeavor of wireless communication device, Akiyama et al. teach wherein the wireless communication circuit (20) is further configured to receive at least one digital command; and the monitoring device (201) is further configured to read the at least one digital command, execute a task in response to said digital command, measure physical or process status data, and store measured data into the memory (23) (column 3 line 54 to column 4 line 15; column 7 lines 45 to 67; see Figure 2) in order to diagnosed each equipment by perform measurement precisely and accurately.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recognize execute the measurement from the received command to stored in the memory taught by Akiyama et al. in a two way wireless link of peer device of Borgstahl et al. in view of Anderson and Hegeman because executing the received command to take a measurement from sensor to store in the memory of the wireless device would improve operation of the peer device.

*Allowable Subject Matter*

Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Referring to claim 20, the following is a statement of reasons for the indication of allowable subject matter: the prior art fail to suggest limitations that the method further comprising analyzing the measured data and reprogramming the programmable communicator in order to re-initiate the monitoring device based on the data analysis.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Stair et al. (US# 5,381,138) disclose an intelligent over-the-air programming.

Anderson (US# 5,995,603) discloses a telephone call screening device.

Foladare et al. (US# 6,108,521) disclose a communication system and method using two-way paging to provide call control.

Roberts et al. (US# 6,208,854) disclose a system and method for routing a call to a called party's landline or wireless communication unit.

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Bushnell (US# 6,289,084) discloses an apparatus, method and system for personal telecommunication call screening and alerting.


Becker et al. (US# 6,606,508) disclose a method for handling phone numbers in mobile station and mobile station.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nam V Nguyen whose telephone number is 571-272-3061. The examiner can normally be reached on Mon-Fri, 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's acting supervisor, Brian Zimmerman can be reached on 571- 272-3059. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nam Nguyen  
July 27, 2007



**BRIAN ZIMMERMAN**  
**PRIMARY EXAMINER**

SECTION 2. FORMS PTO/SB/08A and 08B (formerly Form PTO-1449)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Eveline Wesby Van Swaay Attorney Docket: 1503/105  
 Serial No: 11/329,212 Art Group Unit: ~~2635~~ 2612  
 Date Filed: January 10, 2006 Examiner Name: ~~N/A~~ NAM NGUYEN  
 Invention: Programmable Communicator

LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

U.S. PATENT DOCUMENTS					
Examiner Initials	Reference Number	Document Number	Issue Date	Inventor	Class/Subclass
M	AQ	US 4,908,853	03-13-1990	Matsumoto	379/355.09
	AR	US 5,293,418	03-08-1994	Fakawa	455/566
	AS	US 5,548,271	08-1996	Tsuchiyama et al	340/7.61
	AT	US 5,581,599	12-1996	Tsuji et al	455/415
	AU	US 5,623,533	04-22-1997	Kikuchi et al	455/572
	AV	US 5,742,666	04-21-1998	Alpert	455/404.2
	AW	US 5,903,634	05-11-1999	Wakabayashi et al	379/354
	AX	US 5,946,636	08-1999	Uyeno et al	455.566
	AY	US 6,041,229	03-21-2000	Turner	455/420
	AZ	US 6,125,273	09-2000	Yamagishi, Harumi	455/411

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Reference Number	Country Code	Document Number	Publication Date	Patentee or Applicant	Class/Subclass
M	BA	JP	07087211 A	03-31-1995	Fuji Facon Corp.	H04M01100
	BB	WO	97/23104	06-26-1997	Valentine	H04Q 7/22

Examiner Signature:   
 Date Considered: 7/17/09

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

(Supplemental Information Disclosure Statement--page 5 of 7)

<b>INFORMATION DISCLOSURE CITATION</b> <i>(Use several sheets if necessary)</i>	ATTY DOCKET NO. 077441/02CON	APPLICATION NO. <u>11/329, 212</u> Not Yet Assigned
	Yuzuru Suzuki	
	FILING April 14, 2006	GROUP ART <u>2612</u> Not Yet Assigned

**U.S. PATENT DOCUMENTS**

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
<i>M</i>	5,396,264	03/95	Falcone, et al.			
	6,157,318	12/00	Shigeki Minata			
	6,411,198	06/02	Hirai, et al.			
<i>V</i>	6,573,825	02/03	Moichi Okano			
	6,577,881	06/03	Tatsuji Ehara			

**U.S. PATENT APPLICATION PUBLICATIONS**

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

**FOREIGN PATENT DOCUMENTS**

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
<i>M</i>	2001-177668	06/29/01	JAPAN				
	2001-249860	09/14/01	JAPAN				
<i>S</i>	2002-077438	03/15/02	JAPAN				
	2000-135384	05/16/00	JAPAN				

**OTHER DOCUMENTS** *(Including Author, Title, Date, Pertinent Pages, Etc.)*

<i>M</i>		Japanese Office Action dated March 22, 2006 with a partial English translation.

EXAMINER <i>[Signature]</i>	DATE CONSIDERED <u>7/17/07</u>
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<b>Notice of References Cited</b>	Application/Control No. 11/329,212	Applicant(s)/Patent Under Reexamination VAN SWAAY, EVELINE WESBY	
	Examiner Nam V. Nguyen	Art Unit 2612	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
*	A	US-5,381,138	01-1995	Stair et al.	340/7.41
*	B	US-5,689,442	11-1997	Swanson et al.	380/241
*	C	US-5,745,049	04-1998	Akiyama et al.	340/870.17
*	D	US-5,831,545	11-1998	Murray et al.	340/7.27
*	E	US-5,884,161	03-1999	Hegeman, Johannes	455/445
*	F	US-5,995,603	11-1999	Anderson, W. Thomas	379/142.05
*	G	US-6,108,521	08-2000	Foladare et al.	340/825.49
*	H	US-6,208,854	03-2001	Roberts et al.	455/417
*	I	US-6,289,084	09-2001	Bushnell, William J.	379/67.1
*	J	US-6,424,623	07-2002	Borgstahl et al.	370/230
*	K	US-6,606,508	08-2003	Becker et al.	455/567
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
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	S				
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**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U
	V
	W
	X

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.





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 Alexandria, Virginia 22313-1450  
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Bib Data Sheet

CONFIRMATION NO. 6667

<b>SERIAL NUMBER</b> 11/329,212	<b>FILING OR 371(c) DATE</b> 01/10/2006  <b>RULE</b>	<b>CLASS</b> 340	<b>GROUP ART UNIT</b> 2612	<b>ATTORNEY DOCKET NO.</b> 1503/105
<b>APPLICANTS</b> Eveline Wesby Van Swaay, Tiddington, UNITED KINGDOM;  <b>** CONTINUING DATA *****</b> <i>yes</i> This application is a CON of 10/296,571 01/21/2003 ABN which is a 371 of PCT/EP01/05738 05/18/2001  <b>** FOREIGN APPLICATIONS *****</b> <i>yes</i> FINLAND 20001239 05/23/2000  <b>IF REQUIRED, FOREIGN FILING LICENSE GRANTED** SMALL ENTITY**</b> ** 02/28/2006				
Foreign Priority claimed <input checked="" type="checkbox"/> yes <input type="checkbox"/> no 35 USC 119 (a-d) conditions met <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance Verified and Acknowledged Examiner's Signature: <i>[Signature]</i> Initials: <i>[Initials]</i>	<b>STATE OR COUNTRY</b> UNITED KINGDOM	<b>SHEETS DRAWING</b> 3	<b>TOTAL CLAIMS</b> 20	<b>INDEPENDENT CLAIMS</b> 2
<b>ADDRESS</b> 2101				
<b>TITLE</b> Programmable communicator				
<b>FILING FEE RECEIVED</b> 500	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees ( Filing ) <input type="checkbox"/> 1.17 Fees ( Processing Ext. of time ) <input type="checkbox"/> 1.18 Fees ( Issue ) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

**Index of Claims**



Application/Control No.

11/329,212

Examiner

Nam V. Nguyen

Applicant(s)/Patent under Reexamination

VAN SWAAY, EVELINE WESBY

Art Unit

2612

√	Rejected
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-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
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A	Appeal
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Claim		Date			
Final	Original	7/26/07			
1	√				
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**Search Notes**



Application/Control No.

11/329,212

Examiner

Nam V. Nguyen

Applicant(s)/Patent under Reexamination

VAN SWAAY, EVELINE WESBY

Art Unit

2612

**SEARCHED**

Class	Subclass	Date	Examiner
340	825.49	7/26/2007	NN
340	825.44	7/26/2007	NN
340	311.1	7/26/2007	NN
455	550.1	7/26/2007	NN
455	552.1	7/26/2007	NN
455	414	7/26/2007	NN
455	458	7/26/2007	NN
455	560	7/26/2007	NN
379	353-355	7/26/2007	NN
379	266.01	7/26/2007	NN
379	88.19	7/26/2007	NN
379	230	7/26/2007	NN

**INTERFERENCE SEARCHED**

Class	Subclass	Date	Examiner

**SEARCH NOTES  
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
Search EAST: USPAT; US-PUB; EPO; JPO and Derwent.	7/26/2007	NN
Search Terms programmed telephone number with caller list; address book; saving telephone into database.	7/26/2007	NN

## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	16	(US-20060119468-\$ or US-20040046637-\$).did. or (US-5884161-\$ or US-6108521-\$ or US-6289084-\$ or US-6606508-\$ or US-5978451-\$ or US-6583720-\$ or US-6208854-\$ or US-5995603-\$ or US-5724411-\$ or US-5963864-\$ or US-5946106-\$ or US-5883942-\$ or US-6625457-\$ or US-5831545-\$).did.	US-PGPUB; USPAT	AND	OFF	2007/07/27 10:35
L2	4	l1 and sensor\$2	US-PGPUB; USPAT	AND	OFF	2007/07/27 13:09
L3	5707	sensor\$2 same (mobile adj2 phone\$2 or pager\$2 or cellular adj2 phone)	US-PGPUB; USPAT	AND	OFF	2007/07/27 10:40
L4	471	sensor\$2 same (mobile adj2 phone\$2 or pager\$2 or cellular adj2 phone) same (called or dial\$4)	US-PGPUB; USPAT	AND	OFF	2007/07/27 10:40
L5	96	l4 and "340"/\$.ccls.	US-PGPUB; USPAT	AND	OFF	2007/07/27 13:12
L6	6	l1 and measure\$4	US-PGPUB; USPAT	AND	OFF	2007/07/27 13:11
L7	3257	command\$4 same measure\$4 same (store\$4 same memory)	US-PGPUB; USPAT	AND	OFF	2007/07/27 13:12
L8	193	l7 and "340"/\$.ccls.	US-PGPUB; USPAT	AND	OFF	2007/07/27 13:12
S1	2	"20060119468"	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 10:59
S2	301	340/5.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 10:59
S3	12	S2 and (store\$4 same telephone adj2 number)	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 11:10
S4	2	"20040046637"	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 11:12

## EAST Search History

S5	2	"20060119468"	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 15:58
S6	17	program\$4 same telephone adj2 number\$4 same (caller adj2 list\$2)	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 16:02
S7	3	("5347574"   "5351289"   "5602908").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/18 16:01
S8	1	program\$4 same telephone adj2 number\$4 same (prefer\$4 adj2 caller\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 16:03
S9	25	program\$4 same telephone adj2 number\$4 and (prefer\$4 adj2 caller\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 16:05
S10	46	store\$4 same telephone adj2 number\$4 and (prefer\$4 adj2 caller\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/18 16:05
S11	5	("20020013163"   "20040198427"   "20050020286"   "6052451"   "6449475").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/18 16:08
S12	1	("6052451").URPN.	USPAT	AND	OFF	2007/07/18 16:30
S13	5	("20020013163"   "20040198427"   "20050020286"   "6052451"   "6449475").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/18 16:31
S14	12	("5040208"   "5185782"   "5311574"   "5440615"   "5841852"   "6038292"   "6301354"   "6351279"   "6400804"   "6529586"   "6678365"   "6842767").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/18 16:34
S15	5	("20020013163"   "20040198427"   "20050020286"   "6052451"   "6449475").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 10:26
S16	11	("4582956"   "5235433"   "5289530"   "5388150"   "5394445"   "5428462"   "5448626"   "5521974"   "5541984"   "5552901"   "5563932").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 10:29
S17	2	("5946106").URPN.	USPAT	AND	OFF	2007/07/19 10:33
S18	53	caller adj2 id ADJ2 LIST\$2	USPAT	AND	OFF	2007/07/19 10:33

## EAST Search History

S19	5	("5742669"   "6751485"   "6882714"   "6882828"   "7035674").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 10:33
S20	29	("20020052195"   "20020147818"   "20030081752"   "4166929"   "4582956"   "4959855"   "5155761"   "5438568"   "5511111"   "5572583"   "5758281"   "5841854"   "5898917"   "5943409"   "5978672"   "5991364"   "6014377"   "6018737"   "6035031"   "6075783"   "6104786"   "6178240"   "6212268"   "6317594"   "6408062"   "6477374"   "6542733"   "6658106"   "6716101").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 10:34
S21	8	("20010041600"   "20020009184"   "5329578"   "5479476"   "5724411"   "5768349"   "5978451"   "6289084").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 10:38
S22	10	("5742669").URPN.	USPAT	AND	OFF	2007/07/19 13:04
S23	76	("5883942").URPN.	USPAT	AND	OFF	2007/07/19 13:28
S24	76	("5883942").URPN.	USPAT	AND	OFF	2007/07/19 13:36
S25	8	("20010041600"   "20020009184"   "5329578"   "5479476"   "5724411"   "5768349"   "5978451"   "6289084").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 13:41
S26	2	"20010041600"	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/19 13:46
S27	3	"6606508"	US-PGPUB; USPAT; EPO; JPO; DERWENT	AND	OFF	2007/07/19 13:46
S28	13	("5020091"   "5220599"   "5371781"   "5437053"   "5448622"   "5655015"   "5715308"   "5764730"   "6018654"   "6041103"   "6208854"   "6222921"   "6606508").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 13:47
S29	10	("4908853"   "5303288"   "5349629"   "5371788"   "5483591"   "5592546"   "5724410"   "5901217"   "6041325"   "6047054").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 13:48

## EAST Search History

S30	3	("5347574"   "5351289"   "5602908").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 14:50
S31	14	("5995603").URPN.	USPAT	AND	OFF	2007/07/19 14:51
S32	18	("20030198325"   "20040121759"   "20040204119"   "4953202"   "5200995"   "5280521"   "5467388"   "5546448"   "5655013"   "5692033"   "5802157"   "5809126"   "5864613"   "5884193"   "5995603"   "6246756"   "6741872"   "6768792").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 14:52
S33	11	("4995075"   "5073922"   "5203014"   "5210753"   "5442692"   "5448622"   "5559860"   "5696817"   "5870683"   "5907604"   "5946636").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:27
S34	18	("20030198325"   "20040121759"   "20040204119"   "4953202"   "5200995"   "5280521"   "5467388"   "5546448"   "5655013"   "5692033"   "5802157"   "5809126"   "5864613"   "5884193"   "5995603"   "6246756"   "6741872"   "6768792").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:51
S35	2	authenticate\$4 adj caller\$2 same (mobile adj2 phone)	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:52
S36	322	authenticate\$4 adj caller\$2	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:52
S37	253	S36 and (mobile or wireless)	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:57
S38	33	"6069896"	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/19 15:57
S39	11	(US-20060119468-\$ or US-20040046637-\$).did. or (US-7046782-\$ or US-6606508-\$ or US-6289084-\$ or US-6208854-\$ or US-5995603-\$ or US-5978451-\$ or US-5946106-\$ or US-5883942-\$ or US-5724411-\$).did.	US-PGPUB; USPAT	AND	OFF	2007/07/21 13:12
S40	10	S39 and tone\$2	US-PGPUB; USPAT	AND	OFF	2007/07/21 13:12

## EAST Search History

S41	1	S39 and (ring adj2 tone\$2)	US-PGPUB; USPAT	AND	OFF	2007/07/21 13:33
S42	6	S39 and link\$4	US-PGPUB; USPAT	AND	OFF	2007/07/21 13:55
S43	491	hotlink\$2	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:18
S44	66	S43 and sensor\$2	US-PGPUB; USPAT	AND	OFF	2007/07/21 13:56
S45	2	hotlink\$2 adj2 communicator\$2	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:19
S46	13	Short adj2 Message adj2 Service same (gSM adj2 telecommunications )	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:26
S47	6121	Short adj2 Message adj2 Service and (Link\$4 or hotlink\$2)	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:26
S48	875	Short adj2 Message adj2 Service and (Link\$4 or hotlink\$2) and (sensor\$2)	US-PGPUB; USPAT	AND	OFF	2007/07/23 09:46
S49	544	S48 and (gsm)	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:27
S50	61	S48 and (gsm) and (location adj2 system)	US-PGPUB; USPAT	AND	OFF	2007/07/21 14:27
S51	821	Short adj2 Message adj2 Service and (Link\$4 or hotlink\$2) and (sensor\$2) and wireless	US-PGPUB; USPAT	AND	OFF	2007/07/23 15:17
S52	129	S51 and "340"/\$.ccls.	US-PGPUB; USPAT	AND	OFF	2007/07/23 17:41
S53	27	("5206901"   "5325419"   "5329578"   "5353331"   "5408528"   "5454032"   "5457736"   "5469496"   "5504804"   "5506887"   "5526403"   "5537467"   "5541976"   "5579375"   "5579379"   "5583564"   "5600704"   "5610969"   "5610972"   "5654958"   "5664005"   "5673308"   "5715296"   "5729599"   "5901359"   "5903845"   "5963864").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/23 14:47
S54	44	Short adj2 Message adj2 Service and (call\$2 adj2 forward\$4) and (sensor\$2) and wireless	US-PGPUB; USPAT	AND	OFF	2007/07/23 17:41
S55	587	(call\$2 adj2 forward\$4) and (sensor\$2) and wireless	US-PGPUB; USPAT	AND	OFF	2007/07/23 17:41



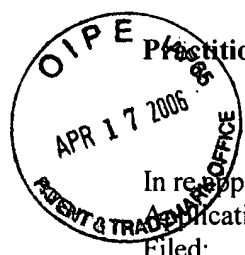
## EAST Search History

S56	84	S55 and "340"/\$.ccls.	US-PGPUB; USPAT	AND	OFF	2007/07/23 17:41
S57	18	("6583720").URPN.	USPAT	AND	OFF	2007/07/23 17:58
S58	2	("6070054").URPN.	USPAT	AND	OFF	2007/07/25 11:12
S59	1	"7113070".pn.	USPAT	AND	OFF	2007/07/25 11:13
S60	22	("4658416"   "4661972"   "4680785"   "4852148"   "4868865"   "4951043"   "4951044"   "4994797"   "5045850"   "5109220"   "5140626"   "5151930"   "5202912"   "5243645"   "5307399"   "5311570"   "5327486"   "5371781"   "5375162"   "5414750"   "5481590"   "5884161").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/25 14:02
S61	6	("5884161").URPN.	USPAT	AND	OFF	2007/07/25 14:18
S62	15	(US-20060119468-\$ or US-20040046637-\$).did. or (US-5995603-\$ or US-7046782-\$ or US-6606508-\$ or US-6289084-\$ or US-6208854-\$ or US-5724411-\$ or US-5978451-\$ or US-5946106-\$ or US-5883942-\$ or US-5963864-\$ or US-6583720-\$ or US-6108521-\$ or US-5884161-\$).did.	US-PGPUB; USPAT	AND	OFF	2007/07/25 16:09
S63	11	S62 and location	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:39
S64	19973	gps and location and (store\$2 same memory)	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:39
S65	0	S64 and ("340"/\$.ccls)	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:39
S66	3813	S64 and ("340"/\$.ccls.)	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:40
S67	1479	S66 and (mobile adj2 device or pager or cell\$4 adj2 phone)	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:40
S68	239	S67 and "455"/\$.ccls.	US-PGPUB; USPAT	AND	OFF	2007/07/26 09:41
S69	9	("5559520"   "5625668"   "5748899"   "5790974"   "5809494"   "5938721"   "6091956"   "6282426"   "6385465").PN.	US-PGPUB; USPAT; USOCR	AND	OFF	2007/07/26 09:48

## EAST Search History

S70	16	(US-20060119468-\$ or US-20040046637-\$).did. or (US-5884161-\$ or US-6108521-\$ or US-6289084-\$ or US-6606508-\$ or US-5978451-\$ or US-6583720-\$ or US-6208854-\$ or US-5995603-\$ or US-5724411-\$ or US-5963864-\$ or US-5946106-\$ or US-5883942-\$ or US-6625457-\$ or US-5831545-\$).did.	US-PGPUB; USPAT	AND	OFF	2007/07/26 10:12
S71	4	S70 and sensor	US-PGPUB; USPAT	AND	OFF	2007/07/26 10:12

DRW



Practitioner's Docket No. 1503/105

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Eveline Wesby Van Swaay  
Application No.: 11/329,212 Group No.: 2635  
Filed: January 10, 2006 Examiner: N/A  
For: Programmable Communicator

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL OF SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT  
WITHIN THREE MONTHS OF FILING OR  
BEFORE MAILING OF FIRST OFFICE ACTION (37 C.F.R. § 1.97(b))

IDENTIFICATION OF TIME OF FILING THE ACCOMPANYING  
SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

The information disclosure statement submitted herewith is being filed within three months of the filing date of the application or date of entry into the national stage of an international application or before the mailing date of a first Office action on the merits, whichever event occurs last. 37 C.F.R. § 1.97(b).

CERTIFICATION UNDER 37 C.F.R. Sections 1.8(a) and 1.10\*  
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*Express Mail certification is optional.*)

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37 C.F.R. § 1.8(a)

37 C.F.R. § 1.10\*

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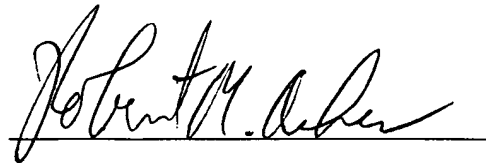
facsimile transmitted to the Patent and Trademark Office, (703) \_\_\_\_\_

Date: April 14, 2006

Signature  
Robert M. Asher  
(type or print name of person certifying)

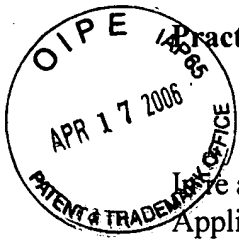
\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

DATE: April 14, 2006

A handwritten signature in black ink, appearing to read "Robert M. Asher", is written over a horizontal line.

Robert M. Asher  
BROMBERG & SUNSTEIN LLP  
Customer Number 02101  
125 Summer Street  
Boston, MA 02110-1618  
US

01503/00105 482219.1



Practitioner's Docket No. 1503/105

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Eveline Wesby Van Swaay  
Application No.: 11/329,212                      Group No.: 2635  
Filed: January 10, 2006                      Examiner: N/A  
For: Programmable Communicator

**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

*NOTE: "An information disclosure statement shall be considered by the Office if filed by the applicant:*

- (1) Within three months of the filing date of a national application;*
- (2) Within three months of the date of entry of the national stage as set forth in section*

(Supplemental Information Disclosure Statement--page 1 of 7)

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**CERTIFICATION UNDER 37 C.F.R. SECTIONS 1.8(a) and 1.10\***  
*(When using Express Mail, the Express Mail label number is mandatory;  
Express Mail certification is optional.)*

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**37 C.F.R. SECTION 1.8(a)**

**37 C.F.R. SECTION 1.10\***

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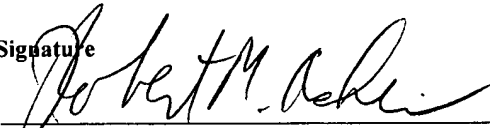
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transmitted by facsimile to the Patent and Trademark Office.

Date: April 14, 2006

Signature

  
\_\_\_\_\_  
Robert M. Asher

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"Since the filing of correspondence under section 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

1.491 in an international application; or  
(3) Before the mailing date of a first Office action on the merits, whichever event occurs last." 37 C.F.R. section 1.97(b).

*NOTE: "Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section." 37 C.F.R. section 1.56(a).*

*"Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:*

- (1) each inventor named in the application;*
- (2) each attorney or agent who prepares or prosecutes the application; and*
- (3) every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application." 37 C.F.R. section 1.56(c).*

*NOTE: The "duty as described in section 1.56 will be met so long as the information in question was cited by the Office or submitted to the Office in the manner prescribed by sections 1.97(b) - (d) and 1.98 before issuance of the patent." Notice of January 9, 1992, 1135 O.G. 13-25 at 17.*

**WARNING:** *"No information disclosure statement may be filed in a provisional application." 37 C.F.R. section 1.51(b).*

### **List of Sections Forming Part of This Information Disclosure Statement**

The following sections are being submitted for this Information Disclosure Statement:

*(check sections forming a part of this statement: discard unused sections and number pages consecutively)*

1.  Preliminary Statements
2.  Forms PTO/SB/08A and 08B (substitute for Form PTO-1449)
3.  Statement as to Information Not Found in Patents or Publications
4.  Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted
5.  Cumulative Patents or Publications
6.  Copies of Listed Information Items Accompanying This Statement
7.  Concise Explanation of Non-English Language Listed Information Items
  - 7A.  EPO Search Report
  - 7B.  English Language Version of EPO Search Report
8.  Translation(s) of Non-English Language Documents
9.  Concise Explanation of English Language Listed Information Items (Optional)
10.  Identification of Person(s) Making This Information Disclosure Statement

(Supplemental Information Disclosure Statement--page 2 of 7)

*(complete the following, if appropriate)*

Sections \_\_\_\_\_, respectively, have been continued on ADDED PAGE(S).

**NOTE** : *"Once the minimum requirements are met, the examiner has an obligation to consider the information." Notice of April 20, 1992 (1138 O.G. 37-41, 37).*

(Supplemental Information Disclosure Statement--page 3 of 7)

## **Section 1. Preliminary statements**

Applicants submit herewith patents, publications or other information, of which they are aware that they believe may be material to the examination of this application, and in respect of which, there may be a duty to disclose.

The filing of this information disclosure statement shall not be construed as a representation that a search has been made (37 C.F.R. section 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this information disclosure statement shall not be construed as an admission against interest in any manner. Notice of January 9, 1992, 1135 O.G. 13-25, at 25.

(Supplemental Information Disclosure Statement--page 4 of 7)



SECTION 2. FORMS PTO/SB/08A and 08B (formerly Form PTO-1449)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Eveline Wesby Van Swaay Attorney Docket: 1503/105  
 Serial No: 11/329,212 Art Group Unit: 2635  
 Date Filed: January 10, 2006 Examiner Name: N/A  
 Invention: Programmable Communicator

LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

U.S. PATENT DOCUMENTS					
Examiner Initials	Reference Number	Document Number	Issue Date	Inventor	Class/Subclass
	AQ	US 4,908,853	03-13-1990	Matsumoto	379/355.09
	AR	US 5,293,418	03-08-1994	Fakawa	455/566
	AS	US 5,548,271	08-1996	Tsuchiyama et al	340/7.61
	AT	US 5,581,599	12-1996	Tsuji et al	455/415
	AU	US 5,623,533	04-22-1997	Kikuchi et al	455/572
	AV	US 5,742,666	04-21-1998	Alpert	455/404.2
	AW	US 5,903,634	05-11-1999	Wakabayashi et al	379/354
	AX	US 5,946,636	08-1999	Uyeno et al	455.566
	AY	US 6,041,229	03-21-2000	Turner	455/420
	AZ	US 6,125,273	09-2000	Yamagishi, Harumi	455/411

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Reference Number	Country Code	Document Number	Publication Date	Patentee or Applicant	Class/Subclass
	BA	JP	07087211 A	03-31-1995	Fuji Facon Corp.	H04M01100
	BB	WO	97/23104	06-26-1997	Valentine	H04Q 7/22

Examiner Signature: \_\_\_\_\_

Date Considered: \_\_\_\_\_

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation *if not* in conformance and not considered. Include copy of this form with next communication to applicant.

## Section 6. Copies of Listed Information Items Accompanying This Statement

*NOTE: 37 C.F.R. section 1.98(a)(2) requires that any information disclosure statement filed under section 1.97 shall include: "A legible copy of: (1) Each U.S. and foreign patent; (ii) Each publication or that portion which caused it to be listed; and (iii) All other information or that portion which caused it to be listed, except that no copy of a U.S. patent application need be included. . ."*

*NOTE: The wording in section 1.98(a)(2)(iii) makes it clear that the requirement to submit a copy of each item of information listed in an information disclosure statement does not apply to the citation of a U.S. patent application. Notice of January 9, 1992, 1135 O.G. 13-25, at 14.*

Legible copies of all items listed in Forms PTO/SB/08A and 08B (substitute for Form PTO-1449) accompany this information statement.

*(complete the following, if applicable)*

Exception(s) to above:

**U.S. patent citations are not included pursuant to the United State Patent and Trademarks Office's September 21, 2004 waiver of the copy requirement in 37 CFR 1.98 for cited pending U.S. patent citations when the patent citations are available in the USPTO's IFW system.**

Items in prior application, from which an earlier filing date is claimed for this application, as identified in Section 4.

Cumulative patents or publications identified in Section 5.

(Supplemental Information Disclosure Statement--page 6 of 7)

**Section 10. Identification of Person(s) Making This Information Disclosure Statement**

The person making this certification is

*(check each applicable item)*

(a)  the inventor(s) who signs below

\_\_\_\_\_  
**SIGNATURE OF INVENTOR**

\_\_\_\_\_  
*(type name of inventor who is signing)*

(b)  an individual associated with the filing and prosecution of this application (37 C.F.R. section 1.56(c))

\_\_\_\_\_  
**SIGNATURE OF INVENTOR**

\_\_\_\_\_  
*(type name of inventor who is signing)*

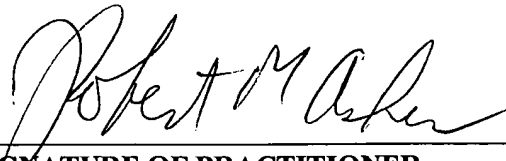
(c)  the practitioner who signs below on the basis of the information:

*(check each applicable item)*

supplied by the inventor(s).

supplied by an individual associated with the filing and prosecution of this application. (37 C.F.R. section 1.56(c)).

in the practitioner's file.



\_\_\_\_\_  
**SIGNATURE OF PRACTITIONER**

**Robert M. Asher**

\_\_\_\_\_  
*(type or print name of practitioner)*

**Bromberg & Sunstein, LLP**

\_\_\_\_\_  
**125 Summer Street, 11<sup>th</sup> Floor**

**P.O. Address**

\_\_\_\_\_  
**Boston, MA 02110-1618**

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Customer No.: 002101

01503/00105 482107.1

(Supplemental Information Disclosure Statement--page 7 of 7)

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MicroPatent's Patent Index Database: Record 2 of 2 [Individual Record of JP7087211A]

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JP7087211A [checked] 19950331 FullText

Title: (ENG) INCOMING CALL SWITCHING DISPLAY DEVICE

Abstract: (ENG)

PURPOSE: To easily recognize a state of incoming call switching of an incoming call switching device (consisting of an on-line switch) provided between a telephone line and plural telephone sets and which selects each telephone set by a recognition code after receiving a temporal incoming call.

CONSTITUTION: The on-line switch 4 is combined with an incoming call switching display device consisting of a switching state display control part 7 and a display part 7a, etc. The display control part 7 displays the telephone set 2 (therefore, an incoming call receiver can be displayed) that is an incoming call switching target on the display part 7a in respective color or tone color via a cable 21 for display. The tone and the tone color can be combined variably, and also, the display part 7 can be provided on the wall plane of residence space in a form of panel, or on the surface of the telephone set 2 in a form of LED or speaker.

Application Number: JP 23063693 A

Application (Filing) Date: 19930917

Priority Data: JP 23063693 19930917 A X;

Inventor(s): NAKAGAWA KAZUMI

Assignee/Applicant/Grantee: FUJI FACOM CORP

Original IPC (1-7): H04M01100

Other Abstracts for Family Members: DERABS G95-181808

Other Abstracts for This Document: DERG95-181808

Legal Status: There is no Legal Status information available for this patent



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(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

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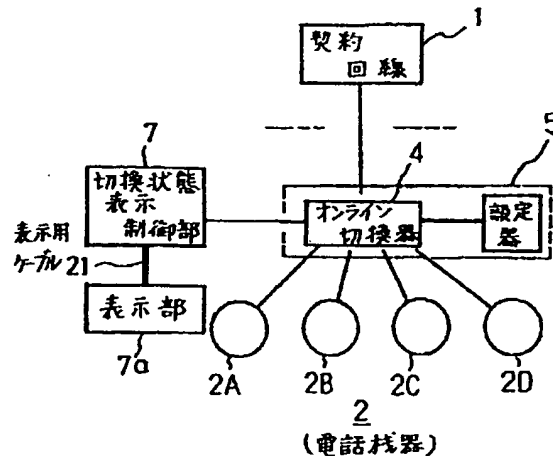
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(54) 【発明の名称】 着信切換表示装置

(57) 【要約】

【目的】 電話回線1と複数の電話機器2(2A~2D)の間に設けられ、仮着信後の認識コードにより前記各電話機器を選択する(オンライン切換器4等からなる)着信切換装置の着信切換の状態を容易に把握できるようにする。

【構成】 オンライン切換器4に切換状態表示制御部7、表示部7a等からなる着信切換表示装置を組合わせる。この表示制御部7は表示用ケーブル21を介し表示部7aに着信切換対象の電話機器2(従って着信人も表示可能)の別を色や音色で表示する。この色や音色の組合せは可変設定することができ、また表示部7は居住空間の壁面にパネルの形で設けたり、電話機器2の表面にLEDやスピーカの形で設けることができる。



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## 【特許請求の範囲】

【請求項1】電話回線と複数の電話機器との間に設けられ、仮着信の後引き続き送られてくる暗証コードにより前記各電話機器を選択する着信切換装置であって、前記各電話機器対応に一つまたは複数の暗証コードを設定、変更する設定・変更手段を持つ着信切換装置により選択された前記電話機器を夫々識別し得る表示を行う着信切換表示手段を備えたことを特徴とする着信切換表示装置。

【請求項2】請求項1に記載の着信切換表示装置において、前記着信切換表示手段の各表示とこの表示によって識別される前記の各電話機器との対応は可変設定し得るものであることを特徴とする着信切換表示装置。

【請求項3】請求項1または請求項2に記載の着信切換表示装置において、前記着信切換表示手段の各表示は発光色、発光間隔、もしくは音色、又はこれらの組合せによって識別区分されるものであることを特徴とする着信切換表示装置。

【請求項4】請求項3に記載の着信切換表示装置において、前記発光色による表示を、居住空間の壁面に設けられ発光表示素子を表面に持つパネルによって行うようにしたことを特徴とする着信切換表示装置。

【請求項5】請求項3に記載の着信切換表示装置において、前記発光色、音色による表示を前記の各電話機器上に設けた発光手段又は発音手段によって行うようにしたことを特徴とする着信切換表示装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】この発明は、電話回線と複数の電話機器との間に設けられ、仮着信の後、引き続き送られて来る暗証コードにより各電話機器を選択する着信切換装置の切換状態を表示する装置に関する。なお、ここに云う電話機器は通常の電話機、留守録、転送等の各種機能をもつ電話機の他に、ファクシミリ、パーソナルコンピュータ、HA (Home Automation) 機器等を含むものとする。また、暗証コードは確認コード、着信コードとも云い、発信する人、受信する人等が相互にわかるような情報を含むコードを指すものとする。

【0002】なお以下各図において同一符号は同一もしくは相当部分を示す。

## 【0003】

【従来の技術】従来、この種の着信切換装置としては1:1の直接、または1:多(n)の同時多数、もしくは親:子の切り換えを行うものが一般的である。図3にこれらの例を示す。すなわち、同図(イ)は契約回線1に対して電話機器2が1:1に接続されている最も一般

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的な接続例、同図(ロ)は契約回線1に対して電話機器2が3台(2A, 2B, 2C)、つまり1:多(n)の並列接続の例であり、(イ)、(ロ)いずれの場合も全ての電話機器で通話(通信)が可能である。これに対し、同図(ハ)では契約回線1に対してオフラインの切換器3が有り、選択ボタン等によって選ばれた電話機器2のうちの一(2A, 2B, 2Cのいずれか)と接続される親:子の接続の例である。また、同図(ニ)に示すものは契約回線1に対してオンライン切換器4が有り、発信者が切換器着信後に入力した(又は切換器に伝達された)暗証番号により直接、選択された電話機器2のうちの一(2A, 2B, 2Cのいずれか)と接続される親:子の選択接続の例である。(ハ)および(ニ)では切換器3又は4で選択された電話機器2のみ、通話(通信)が可能である。

## 【0004】

【発明が解決しようとする課題】しかしながら、上記いずれの方式も選択される電話機器が固定されているため、着信先を変更しようとするハード的な接続変更が必要となる。またこのようなオンライン切換器4を持つ着信切換装置では、この切換器4によって切換選択された対象の電話機器が2A~2C等の何れであるかの着信切換状態を容易に把握できることが望ましい。

【0005】そこで、この発明は着信先を変更する場合でもハード的な接続変更を要せず、変更作業を容易にした着信切換装置に組合せ、その着信切換状況を表示することで着信人の特定をより明確にすることができる着信切換表示装置を提供することを課題とする。

## 【0006】

【課題を解決するための手段】前記の課題を解決するために、請求項1の着信切換表示装置は、電話回線(契約回線1など)と複数の電話機器(2(2A~2D)など)との間に設けられ、仮着信の後引き続き送られてくる暗証コードにより(オンライン切換器4などを介し)前記各電話機器を選択する着信切換装置であって、前記各電話機器対応に1つまたは複数の暗証コードを設定、変更する設定・変更手段(設定器5など)を持つ着信切換装置により選択された前記電話機器を夫々識別し得る表示を行う着信切換表示手段(切換状態表示制御部7、表示部7aなど)を備えたものとする。

【0007】また請求項2の着信切換表示装置では、請求項1に記載の着信切換表示装置において、前記着信切換表示手段の各表示とこの表示によって識別される前記の各電話機器との対応は可変設定し得るものであるようにする。また請求項3の着信切換表示装置では、請求項1または請求項2に記載の着信切換表示装置において、前記着信切換表示手段の各表示は発光色、発光間隔、もしくは音色、又はこれらの組合せによって識別区分されるものであるようにする。

【0008】また、請求項4の着信切換表示装置は、請

請求項3に記載の着信切換表示装置において、前記発光色による表示を、居住空間の壁面（15など）に設けられ発光表示素子を表面に持つパネル（13など）によって行うようにする。また請求項5の着信切換表示装置は、請求項3に記載の着信切換表示装置において、前記発光色、音色等による表示を前記の各電話機器上に設けた発光手段（LED表示22など）又は発音手段（表示用スピーカ23など）によって行うようにする。

#### 【0009】

【作用】発信者が入力する電話番号後の認識コードにより、各種電話機器への接続を決定すべく、発信者（あらかじめ認識コードを着信者より通達されている）によって入力された認識コードと、あらかじめ登録しておいた認識コード系列とを照合し、その照合結果が良好ならば、該当する電話機器を回線へ接続するにあたり、電話機器と認識コードとの対応関係を上記設定・変更手段にて任意に変えられるようにし、ハード的な設定・変更作業をしなくても済むようにすると共に、該当する電話機器や着信人を表示することにより、その接続状況が居ながらにして把握できるようにする。

#### 【0010】

【実施例】図1は本発明の実施例を示すブロック図で、図3の(二)に対応するものである。図1においては図3(二)に対し、オンライン切換器4に設定器5と切換状態表示制御部7が接続されている。また表示制御部7には表示用ケーブル21を介して表示部7aが接続されている。なお4、5、7の手段は一体型であってもよ \*

\*い。

【0011】ここで契約回線1よりオンライン器4へ着信（仮着信）すると、引き続き発信者から送られて来る認識コード、たとえば「0・1・2」と、オンライン切換器4が予め記憶している登録番号群とを照合し、その着信に対して接続する電話機器を決定する。「0・1・2」の場合は、例えば2Aの電話機器とする。なお、この接続（対応関係）についてもあらかじめ登録しておくものとする。この様にして、契約回線1が電話機器2に接続される。通話信号は切換器4から選択された電話機器2以外に流れない。また、「0・1・2」なる認識コードで電話機器2B、2Cまたは2Dを選択するには、設定器5により対応関係を設定すればよい。

【0012】このようにすることにより、ハード的な接続変更を行うことなしに、着信電話機器2の変更ができる。また切換状態表示制御部7は表示用ケーブル21を介し表示部7aに電話機器2（2A～2D）の何れが着信したかを表示することができる。なお以下切換状態表示制御部7、表示部7a等を一括して着信切換表示装置という。

【0013】次に、このように構成した場合の応用例について説明する。

イ) 或る組立工場の場合

この場合の例として、次の表1の如くすることが考えられる。

【0014】

【表1】

発信者	認識コード	機 器		
		DAY1	DAY2	夜 間
顧 客	2・3・5	2A	2A	2C
代理店	2・2・2	2A	2B	2C
部品店	1・3・8	2A	2B	2D
認識コードなし、照合なし		2B	2B	2D

すなわち、普通の日（DAY1）はそのほとんどが電話機器2Aに直接接続され、工場主任が電話機器2Aで応対する。認識コードがないとき、または対応する認識コードがないときだけ部下が応対（電話機器2Bにて）し、必要ならば電話機器2Aに回す。これに対し、新製品の打合せて忙しい日（DAY2）は、直接工場主任が受ける電話機器を制限して顧客からの通話（通信）のみとし、他は部下が応対する様に変更する。また、夜間は転送機能付電話機2Cにより、顧客と代理店からの電話は工場主任の自宅へ転送され、留守番機能付電話機2D※50

※にはその他の通話が接続される。なお、認識コードをここでは3桁としているが、これに限らないことは言うまでもない。

【0015】また着信切換表示装置7、7a等は認識コードの違いを例えば異なる発光色、発光間隔、音色等によって表示する。

ロ) 或る家庭の場合

この場合の例として、次の表2のようにすることが考えられる。

【0016】

【表2】

認識コード	表示部	電話機器	
着信者の部屋コード	発光色	本人在室 ↔ 本人不在 or 食事	
父の部屋 11	白	2A ↔ 2F	or 2E
母の部屋 12	赤	2B ↔ 2F	or 2E
兄の部屋 13	青	2C ↔ 2F	or 2E
弟の部屋 14	緑	2D ↔ 2F	or 2E
リビング 15	ワジ	2E	2E
認識コードなし	黄	2E	2E
照合なし	黄	2E	2E

すなわち、家庭でのプライバシー保護の観点から、認識コードにより直接本人の部屋の電話機器を鳴らすこととする。また、別の部屋に居る時は、その旨の設定変更で対処可能となる。

【0017】また、表示部7aの示す発光色、発光間隔、音色により、着信人が他の部屋にいても、その固有の着信人で有ることを居ながらにして把握できるようにする。ここで本人不在の時は他の家族が居ても、留守番機能付電話機2Fに接続することもできる。以上では、1つの電話機器に1つの暗証コードまたは認識コードを与えるようにしたが、複数の認識コードを与えることもできる。この場合、着信に対して予めクラス分けを行なうとともに、クラスと電話機器との対応関係を設定しておき、認識コードが入力されたら、これがどのクラスに\*

\*対応するかを照合することが必要になる他は、1つの認識コードを与える場合と全く同様である。

【0018】またこの場合、表示部7aはクラスごとに異なる表示を示すようにする。1つの電話機器に複数の認識コードを与える場合の応用例としては、次のようなものがある。

a) 或る組立工場の場合

この場合の例として、表3の如くすることが考えられる。これは、認識コードが2つ与えられている点を除けば表1と全く同様なので、説明は省略する。なお、①~(N)はクラスの番号を示す。

【0019】

【表3】

発信者	認識コード番号	クラス	機器			表示部
			DAY1	DAY2	夜間	発光色
顧客	2・3・5 6・4・8	①	2A	2A	2C	赤
代理店	2・2・2 8・3・5	②	2A	2B	2C	ワジ
部品店	1・3・6 2・5・6	③	2A	2B	2D	黄
暗証番号なし	.....	(N)	2B	2B	2D	緑

b) 或る同屋の場合

この場合の例として、表4の如くすることが考えられる。

※【0020】

【表4】

※



発信者	認識コード番号	クラス	機器			表示部
			DAY1	DAY2	夜間	発光色
商店主	2・1 3・6	①	2A	2C	2D	赤
スーパー	5・8	②	2A	2C	2D	緑
問屋仲間	2・3 2・4 2・5	③	2B	2A	2D	黄
貿易商	1・8 1・9	④	2B	2A	2E	緑
認識コードなし	.....	(N)	2C	2C	2D	白

すなわち、或る日 (DAY1) は、問屋主は主に商店、スーパーと売り物に対する連絡を優先し、電話機器2Aで直接通話 (通信) する。そして、次の日 (DAY2) には、問屋主は主に問屋仲間、貿易商と買い物に対する連絡を優先し、電話機器2Aで通話 (通信) する。その他は、担当者が電話機器2B又は2Cで対応する。夜間は、貿易商からの通話 (通信) のみ転送機能付電話機2\*

20 \* Eに接続され、他は留守番機能付電話機2Dに接続される。

【0021】c) 小規模会社の場合

この場合の例として、表5の如くすることが考えられる。

【0022】

【表5】

認識コード番号 着信者の個人コード (職場コード)	職場変更前 職場名(クラス), 機器	表示部 発光色	職場変更後 職場名(クラス), 機器	表示部 発光色
218 (山本)	①, 2A	赤	①, 2B	赤
378 (太田)	①, 2A	赤	②, 2A	オレンジ
196 (山下)	①, 2A	赤	①, 2B	赤
785 (村上)	①, 2A	赤	③, 2C	黄
373 ( . )	②, 2B	オレンジ	①, 2B	赤
592 "	②, 2B	"	③, 2C	黄
666 "	②, 2B	"	②, 2A	オレンジ
188 "	②, 2B	オレンジ	②, 2A	オレンジ
298 "	③, 2C	黄	③, 2C	黄
311 "	③, 2C	"	③, 2C	黄
259 ( . )	③, 2C	黄	②, 2A	オレンジ
(91) (営業)	(1), 2A	赤	(1), 2B	赤
(92) (経理)	(2), 2B	オレンジ	(2), 2A	オレンジ
(93) (人事)	(3), 2C	黄	(3), 2C	黄

【0023】即ち着信後の個人番号により、自動的にその個人の所属する職場の電話機器に接続され、職場の組織変更が有ると通常はそのレイアウトや構成人員が変更になるが、電話機器のハードはそのままにして、職場のクラス対応と個人番号のグループ分け(クラス分け)を変更することにより、新たな場所に以前のままのコードで接続することができる。

【0024】また表示部7aによる着信表示はそのクラ\*

30\*ス(部署)ごとに異なる発光を示すことができる。

d) 家庭の場合

この場合の例として、表6のようにすることが考えられる。なおこれはクラス分け(①~③)をしたことを除けば表2と全く同様なので、説明は省略する。

【0025】

【表6】

認識コード番号 着信者の部屋コード	クラス	表示部 発光色	機器 本人 ↔ 本人 or 食事 在室 不在 (ビツグ)
父の部屋 11	①	白	2A ↔ 2F or 2E
母の部屋 12	②	赤	2B ↔ 2F or 2E

1 1		1 2	
兄の部屋 13	㊸	青	2C ↔ 2F or 2E
弟の部屋 14	㊹	緑	2D ↔ 2F or 2E
リビング 15	㊺	オレンジ	2E 2E
認識コードなし	㊻	黄	2E 2E

以上の様な応用例を考えると、設定器5による設定よりも図2の如きパソコン（パーソナルコンピュータ）6による設定管理の方が良い場合もある。また、簡単な変更は電話機器2からオンライン切替器4へ連絡変更出来る様なシステムとすることも考えられる。

【0026】また着信表示切替装置もプログラム可能で各種のパターンで表示させることが可能である。図4は着信切替表示装置の居住空間への表示方法の実施例を示す。同図において16は壁11、12等の壁面15に沿ってフロア面に平行に、目の位置より低い位置に設けられた壁面ケーブルダクトで、このダクト16内には、この例では同図（ロ）の拡大図に示すように、電話線17、電力線18、ホームバス19、AV・CATV等の線20、切替状態表示制御部7とその表示部7aとを結ぶ表示用ケーブル21等が収容されている。

【0027】13はこのダクト16の壁面15側の面上に設けられたパネルで夫々各種の発光色の発光表示素子からなり、切替状態表示制御部7によって表示制御される表示部7aを構成している。そして切替状態表示制御部7から表示用ケーブル21を介しパネル13の各色のパネルのうち該当色パネルが発光するようにするものである。なお該当色パネルは壁面上に複数枚配置してもよい。

【0028】なおこのような発光パネル13の代わりにスピーカーパネル等で、音色による表示を行うことも可能である。また前述のようにダクト16は他のケーブルと共同利用可能であるため、パネル13としては表示発光パネルの他に、電源コンセントパネル、電話パネル、CATVパネル等を配置することも可能である。

【0029】図5は着信切替表示装置の表示部7aを電話機器2に組込んだ実施例を示す。同図に示すように、この電話機器2の上には通常電話（多機能電話）の押しボタン24等以外に、表示部7aを構成する各発光色のLED22が配置されている。また音色により着信状況を示す時は同じく表示部7aを構成する表示用スピーカー23から音色を作り出す。

【0030】

【発明の効果】この発明によれば、契約回線からの着信\*

10\*を自動的に目的の電話機器に接続する着信切替装置に着信切替表示装置を組合せるようにしたので、レイアウト変更等への対応、着信の選択、転送、留守録、それらのスケジュール管理など、応用範囲の広いフレキシブルなシステムを構成すると共に、受信機や電話機器の操作なしに、その着信を判断できる。

【図面の簡単な説明】

【図1】この発明の実施例を示すブロック図

【図2】この発明の他の実施例を示すブロック図

20 【図3】電話機器の電話回線に対する一般的な接続態様を説明するための説明図

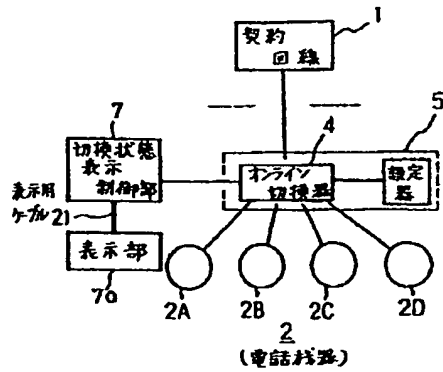
【図4】本発明の着信切替表示装置を居住空間に応用した実施例を示す図

【図5】本発明の着信切替表示装置を個別電話機器に応用した実施例を示す図

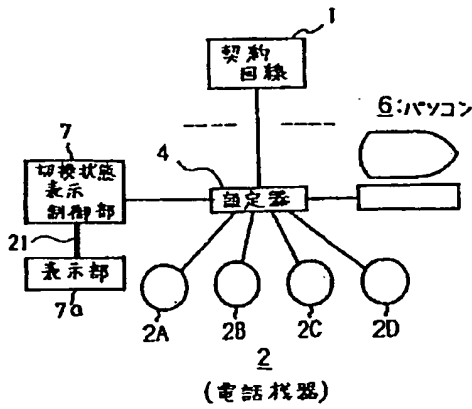
【符号の説明】

- 1 契約回線
- 2 (2A~2F) 電話機器
- 3 オフライン切替器
- 4 オンライン切替器
- 5 設定器
- 6 パソコン（パーソナルコンピュータ）
- 7 切替状態表示制御部
- 7a 表示部
- 11 壁
- 12 壁
- 13 パネル
- 14 フロア面
- 15 壁面
- 16 壁面ケーブルダクト
- 17 電話線
- 18 電力線
- 19 ホームバス
- 20 AV、CATV線
- 21 表示ケーブル
- 22 LED表示
- 23 表示用スピーカ
- 24 押しボタン

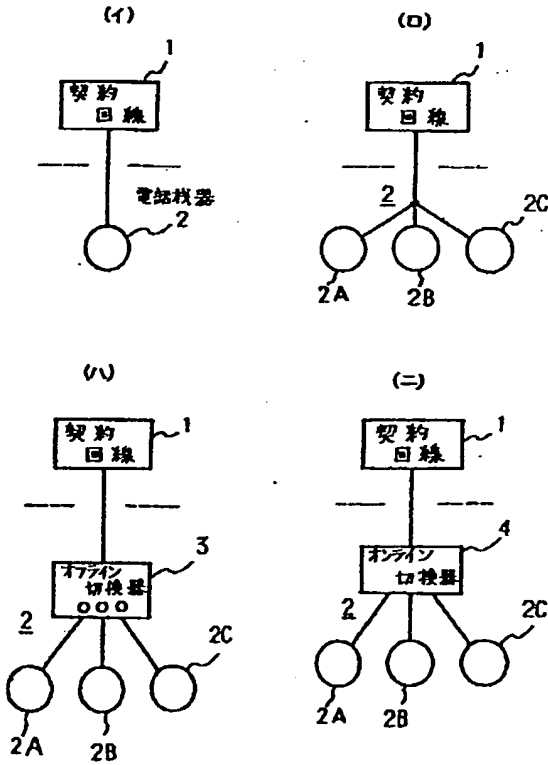
【図1】



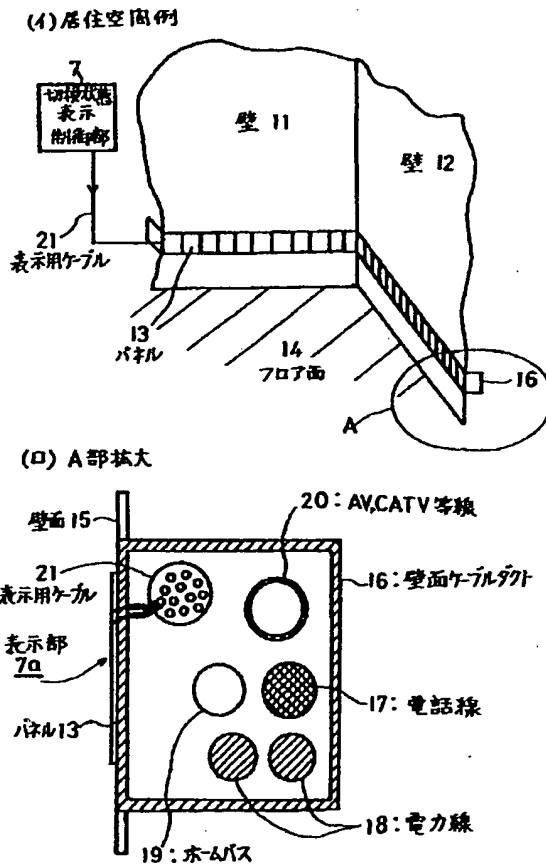
【図2】



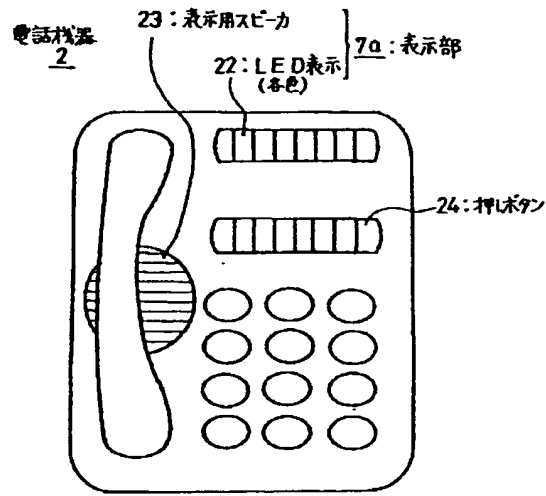
【図3】



【図4】



【図5】



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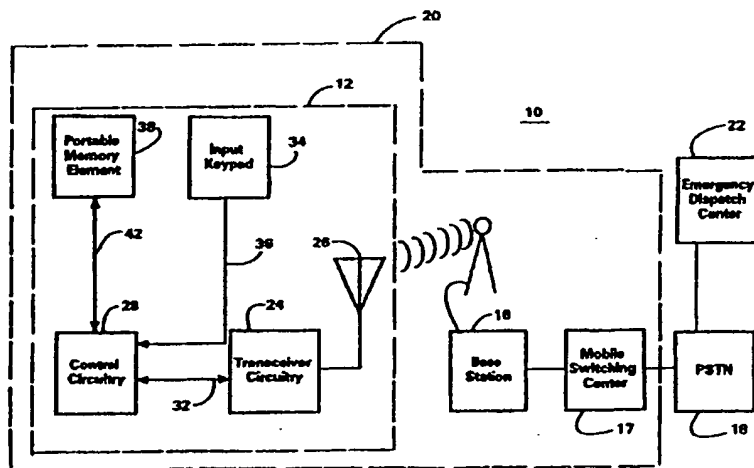


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<p>(21) International Application Number: PCT/US96/20419 (22) International Filing Date: 19 December 1996 (19.12.96)  (30) Priority Data: 08/574,554 19 December 1995 (19.12.95) US  (71) Applicant: ERICSSON INC. [US/US]; 7001 Development Drive, P.O. Box 13969, Research Triangle Park, NC 27709 (US).  (72) Inventor: VALENTINE, Eric, Lee; 1600 Brazos Trail, Plano, TX 75075 (US).  (74) Agents: MOORE, Stanley, R. et al.; Jenkins &amp; Gilchrist, P.C., Suite 3200, 1445 Ross Avenue, Dallas, TX 75202 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	

(54) Title: RADIO TRANSCEIVER MEMORY DEVICE AND METHOD FOR FACILITATING EMERGENCY COMMUNICATIONS



(57) Abstract

A device (12) and associated method (72) for automatically transmitting information by way of a radio transceiver (24) responsive to a request for emergency assistance initiated by way of the radio transceiver (24). Informational data pertaining to a subscriber is stored in a portable memory element (38), such as a SIM memory card of a cellular, communication system (20). When entry of a request, such as entry of the digits "9-1-1" for emergency assistance is requested, the informational data is automatically accessed and transmitted to provide emergency personnel (22) with the informational data.

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**RADIO TRANSCEIVER MEMORY DEVICE AND METHOD  
FOR FACILITATING EMERGENCY COMMUNICATIONS**

5      TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to the communication of data by way of a radio transceiver to an emergency dispatch center. More particularly, the present invention relates to a device and method for automatically  
10      transmitting information to the emergency dispatch center when a call is placed at the radio transceiver to the emergency dispatch center.

BACKGROUND OF THE INVENTION

15      In recent years, telephonic communication effectuated by way of a cellular, or other wireless, communication network has become increasingly popular. In such a system, communication signals are transmitted between two communication stations by way of transmission of radio  
20      frequency signals upon radio frequency channels. Because a wireline connection is not required to effectuate the telephonic communication with a remotely-positioned communication station, telephonic communication by way of the cellular, or other wireless, communication network is  
25      possible in situations in which a wireline connection connecting the communication stations is impractical.

Initiation of telephonic communication links in a cellular communication system is typically accomplished in a manner analogous to the initiation of telephonic  
30      communication links in a conventional, wireline, telephonic system. A calling party initiates  
~~communication with a called party by entering an~~

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identification number, i.e., the telephone number, of the party to whom telephonic communication is to be effectuated. Network switching apparatus interprets the telephone number and provides the necessary connections to effectuate the telephonic communication. Calls can be placed by way of, e.g., a radio telephone forming the remotely-positioned, communication station to any other station coupled to the telephonic network by entering and transmitting the telephone number of the called party.

10 In some sections of the United States, telephonic networks provide emergency "911" service. Other countries provide analogous service. In areas of the country which provide for "911" service, a caller requiring emergency assistance dials, or enters, the digits 9-1-1. When the telephonic network detects entry of such digits, connection of the calling party to an emergency dispatch center is immediately effectuated. In other countries, other sequences of digits are entered by a caller, similarly to be connected to an emergency dispatch center.

20 An emergency call can be placed by a subscriber of a radio telephone in a manner similar to the manner by which a caller located at a wireline station can place an emergency call. However, in a conventional telephonic network in which "911" emergency service is provided, dispatch personnel of the emergency dispatch center are provided with the position from which the request for emergency assistance is initiated. The personnel of the emergency dispatch center utilize such positional information to facilitate the dispatch of emergency personnel to the scene of the emergency.

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While the positional information can be readily provided to the dispatch personnel of the emergency dispatch center when the calling party is located at a conventional, wireline, calling station, if the calling party utilizes a radio telephone, or other wireless communication device, to request the emergency assistance, the position of the calling party cannot be automatically provided to the dispatch personnel of the emergency dispatch center. In the event that the calling party is unable otherwise to provide the dispatch personnel with the location at which the emergency assistance is required, the appropriate emergency assistance might not be able to be provided.

If the calling party is not able to provide the dispatch personnel with the required positional information, the calling party might well be the one necessitating the emergency assistance. The nature of the emergency as well as information relating to the calling party might well similarly not be able to be communicated by the calling party to the dispatch personnel.

In order to permit communication by way of, or with, a radio telephone operable in a conventional, cellular, or other wireless, communication network, certain control information must be communicated between the radio telephone and the fixed, network portion of the cellular communication network. For instance, an electronic serial number which uniquely identifies a radio telephone in the cellular communication system must be transmitted by the radio telephone to the fixed, cellular network portion during call set-up procedures. The electronic serial number is stored in a memory element of the radio

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telephone. Other data is similarly stored at the radio telephone.

Several existing and planned wireless networks provide for the utilization of radio telephones which make use of removable memory elements, sometimes referred to as "SIM" cards. The removable memory elements contain data including the aforementioned electronic serial number. The Group Special Mobile (GSM) cellular, communication system provides for the utilization of radio telephones having removable memory elements. In the GSM system, the removable memory elements are disposed on or in a card member. The radio telephone includes an assemblage, referred to as a card reader assembly, for receiving a card member. A card reader assembly typically comprises structure forming a receiving platform and electrodes positioned in proximity to the receiving platform. The electrodes are also coupled to other structure of the radio telephone and permit an electrical connection to be formed with corresponding electrodes of a removable memory element.

The electrodes of the removable memory element are disposed upon a face surface of the card member. When the card member is suitably positioned at the receiving platform of the card reader assembly, the electrodes of the card member and the card reader assembly become aligned with one another and electrical connections are formed therebetween. Once suitably aligned and connected, the information stored within the memory element may be transferred to the circuitry of the radio telephone.

Radio telephones which permit the utilization of removable memory elements are advantageous, at least in

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part, for the reason that a user of more than one radio telephone may alternately operate the two or more radio telephones while requiring only a single billing account. Calls placed by either of the radio telephones, when the memory element is suitably positioned therein, are, e.g.,  
5 billed to a single billing account.

At least two configurations of SIM card member dimensions have been standardized. A first standardized configuration of card member, sometimes referred to as a  
10 C-Net-sized card member (as specified in the International Standard, ISO 7816, Parts 1-3) defines the dimensions of the card member to correspond generally to the physical dimensions of a conventional credit card. A second, standardized configuration of card member, sometimes  
15 referred to as a D-Net-sized card member (as also specified in the International Standard, ISO 7816, Parts 1-3) defines dimensions of the card member to be of smaller dimensions than those of the C-Net-sized card member.

20 Either of such card members, as well as other memory elements, include user-defined memory element portions. User-defined memory element portions permit the storage of user-defined data therein. Such user-defined data is in addition to the electronic serial number and other data  
25 also stored in the memory element. Such user-defined memory element portions have been utilized, for example, to store speed-dialing, calling lists. Speed-dialing calling lists facilitate the entry of calling codes by a subscriber of services in the communication system.

30 Other data in such user-defined memory element portions can also be stored. Certain data stored in the

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memory element would additionally facilitate the dispatch of emergency assistance in the event that a request for emergency assistance is made by a subscriber to a cellular, or other wireless, communication system.

5           It is in light of this background information related to removable memory elements utilized in wireless communication systems that the significant improvements of the present invention have evolved.

#### 10       SUMMARY OF THE INVENTION

          The present invention advantageously provides a device and method for a radio telephone operable in a cellular, or other wireless, communication system which facilitates the communication of informational data to an  
15       emergency dispatch center. The informational data is communicated to the emergency dispatch center automatically when a call to the emergency dispatch center is placed at the radio telephone. Because the information is transmitted automatically, information is provided to  
20       the emergency dispatch center even if the subscriber of the radio telephone is unable otherwise to communicate with personnel of the emergency dispatch center.

          By storing the informational data at the removable memory element which also contains identification data,  
25       the informational data is portablized in the same manner in which the identification data is portablized upon the memory element. Any radio telephone in which the memory element is inserted for conventional reasons, i.e., for billing and operational reasons, is automatically provided  
30       with the informational data associated with the subscriber. In the event that an emergency call is placed

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with the radio telephone, such informational data is automatically provided to an emergency dispatch center.

When the radio telephone is positioned together with a global positioning receiver, positional data generated  
5 by the global positioning receiver is also provided automatically to the dispatch personnel of the emergency dispatch center. The position, which might otherwise be indeterminate, of the subscriber placing the emergency call can thereby be provided to the emergency dispatch  
10 center to facilitate the dispatch of appropriate emergency personnel.

In accordance with one aspect of the present invention, therefore, a device, and an associated method, provides informational data associated with a subscriber  
15 of a radio communication system to an emergency dispatch center. The radio communication system is permitting of telephonic communication by way of a mobile subscriber unit and is operable at least to communicate telephonically with the emergency dispatch center  
20 responsive to entry of a request entered by way of a mobile subscriber unit transducer. A memory element is removably connectable to the mobile subscriber unit. Informational data associated with the subscriber is stored in the memory element. An emergency request  
25 controller detects times in which the request to communicate telephonically with the emergency dispatch center is entered by way of the mobile unit. Responsive thereto, the informational data stored at the memory element is transmitted to the emergency dispatch center.

30 A more complete appreciation of the present invention and the scope thereof can be obtained from the

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accompanying drawings which are briefly summarized below, the following detailed description of the presently-preferred embodiments of the invention, and the appended claims.

5

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a functional block diagram of a communication system which incorporates an embodiment of the present invention as a portion thereof.

10

Figure 2 is a perspective view of a card member containing a memory element of an embodiment of the present invention which stores informational data therein.

15

Figure 3 is an hierarchical block diagram illustrating the hierarchical arrangement of data stored in the memory element shown in Figure 2.

Figure 4 is a logical flow diagram illustrating the method of operation of an embodiment of the present invention.

20

Figure 5 is a diagram illustrating the format of an emergency message transmitted during operation of an embodiment of the present invention.

25

Figure 6 is a functional block diagram illustrating fixed-station equipment of an embodiment of the present invention and the connection thereof to an emergency dispatch center.

Figure 7 is a functional block diagram of another embodiment of the present invention.

#### DETAILED DESCRIPTION

30

Referring first to Figure 1, a communication system, shown generally at 10 is shown. An embodiment of the



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present invention forms a portion of the communication system 10. The communication system 10 forms a wireless communication system, here a cellular communication system. The teachings of the present invention may analogously be utilized in other types of wireless communication systems and the following description of operation of embodiments of the present invention in a cellular communication system is exemplary in nature.

The system 10 includes a radio telephone 12 which generates and transmits radio frequency signals upon a radio frequency channel to a fixed-site base station 16. The base station 16 is coupled to a mobile switching center (MSC) 17. The mobile switching center, in turn, is coupled to a public service telephonic network (PSTN) 18.

The PSTN 18, in conventional manner, is coupled to numerous wireline locations, such as the emergency dispatch center 22. While not shown in the figure, a conventional cellular communication system typically includes a plurality of base stations positioned at spaced-apart locations throughout a geographical area. The base station 16 illustrated in Figure 1 is exemplary of one of such base stations. The radio telephone 12, base station 16, and MSC 17 together form a public land mobile network (PLMN) 20.

The radio telephone 12 is illustrated in the figure to include transceiver circuitry 24 having transmitter and receiver portions for transmitting and receiving signals by way of an antenna element 26. Operation of the radio telephone 12 is controlled by control circuitry 28 which is coupled to the transceiver circuitry by way of lines

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32. An operator of the radio telephone 12 inputs control commands and data to effectuate operation of the radio telephone by way of an input keypad 34 which is coupled to the control circuitry 28 by way of lines 36. In one  
5 embodiment of the present invention, the keypad includes a dedicated key for requesting emergency assistance. Actuation of the dedicated key permits a request for emergency assistance to be made merely by actuation of the dedicated key.

10 A portable memory element 38 is releasably connectable to the control circuitry 28 by way of lines 42. In one embodiment of the present invention, the portable memory element 38 is disposed upon a C- or D-Net-sized card member, as described above. When suitably  
15 positioned at, and coupled to, the control circuitry 28, the portable memory element 38 forms a portion of the radio telephone 12. When released out of engagement with the lines 42 extending to the control circuitry 28, the memory element 38 can be removed out of the radio  
20 telephone 12, all in conventional fashion.

As described above, a portable memory element is received at a card reader assembly, thereby to be connected to the control circuitry 28. The lines 42 extend to electrodes forming portions of the card reader  
25 assembly to permit the electrical connections to be formed with the memory element 38.

A subscriber of the radio telephone 12 can communicate telephonically with any communication station connected to, or coupled to, the PSTN 18. Telephonic  
30 communication can be initiated at the radio telephone 12 by way of appropriate input entered by way of the input

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keypad 34. Alternately, telephonic communication can be initiated at another communication station connected to the PSTN 18 in conventional manner.

In the event of an emergency situation, a subscriber operating the radio telephone 12 can request emergency assistance by placement of a call to emergency personnel to request assistance. In areas which provide for "911" emergency calls, appropriate entry of the digits "9-1-1" by way of the input keypad 34 initiates communication between the subscriber positioned together with the radio telephone 12 and emergency personnel located at an emergency dispatch center, here emergency dispatch center 22. Once telephonic communication is effectuated between the radio telephone 12 and the emergency dispatch center 22, dispatch personnel at the emergency dispatch center 22 can dispatch appropriate emergency personnel to provide assistance to alleviate the emergency.

As noted above, when 911-emergency assistance is requested by way of a wireline device, positional information related to the position of the wireline device is automatically communicated to the emergency dispatch center. Because a wireless device, such as the radio transceiver 12 is not connected to the PSTN 18 by way of a wireline connection, the precise location of the radio telephone 12 can not be automatically communicated to dispatch personnel at the emergency dispatch center. Only the location of the base station 16 at which radio frequency signals 14 transmitted by the radio telephone 12 are received can be automatically transmitted to the emergency dispatch center. Such location can provide dispatch personnel of the emergency dispatch center with

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the general area at which the radio telephone 12 is positioned, but the precise location of the radio telephone can not be determined without the communication of additional information provided by the subscriber at the radio telephone 12.

The subscriber initiating the emergency request by way of the radio telephone 12 might be unable to provide to the dispatch personnel information pertaining to the subscriber's position. If the subscriber is unable to provide the positional information, the subscriber might well be the party in need of emergency assistance, and the subscriber might well be unable to communicate to the dispatch personnel other identification information related to the subscriber, such as the subscriber's medical history and physical characteristics.

In an embodiment of the present invention, identification data is stored at the portable memory element 38. The identification data includes, *inter alia*, data pertaining to the medical history of the subscriber and the physical characteristics of the subscriber. In the event that the subscriber initiates a call to an emergency dispatch center, such as the center 22, the control circuitry 28 detects such initiation and automatically transmits the identification data stored at the portable memory element 38 whereat detection of such transmitted information can thereafter be provided to the dispatch personnel of the emergency dispatch center.

The identification data stored at the portable memory element 38 can be retrieved and thereafter modulated by the transmitter portion of the transceiver circuitry 24 in a manner analogous to the manner by which the

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electronic serial number and other data conventionally stored at the portable memory element is retrieved therefrom and modulated by the transceiver circuitry 24. Once modulated, the data is transmitted upon a radio  
5 frequency channel.

Appropriate software or hardware logic of the control circuitry 28 can detect entry of a selected sequence of digits by way of the input keypad 34 such as the  
10 aforementioned 9-1-1 sequence. Alternately, actuation of a particular key of the keypad 34 dedicated for emergency communications can be detected by logic of the control circuitry. Upon detection of entry of a particular sequence of digits, or actuation of the  
15 dedicated key, the control circuitry 28 accesses memory locations of the portable memory element 38, retrieves the data stored therein, and provides such data to the transceiver circuitry 24 to be modulated thereat. While  
separate lines 42 and 32 are illustrated in the figure, the data retrieved from the portable memory elements may  
20 be transmitted by way of an internal bus of the radio telephone 12 to the transceiver circuitry 24.

In one embodiment of the present invention, the identification data transmitted by the radio telephone 12 is received by the base station 16 and thereafter stored  
25 in a storage location which is accessible by personnel of the emergency dispatch center. When the telephonic communication is effectuated with the dispatch center 22, the personnel of the dispatch center are provided with an indication that the identification data has been received  
30 at the base station 16 and stored in appropriate storage elements coupled thereto. The personnel of the emergency

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dispatch center can thereafter retrieve such storage data if necessary.

The portable memory element 38 is again shown in Figure 2. In the embodiment illustrated in Figure 2, the memory element forms a C-Net-sized card member of physical dimensions corresponding roughly to the dimensions of a conventional-sized credit card. The memory element 38 is of dimensions specified for a C-Net-sized SIM card and includes a read only memory (ROM) portion, a random access memory (RAM) memory portion and an electrically erasable programmable read only memory (EEPROM) memory portion.

An integrated circuit 42 mounted upon a plastic frame 44 forms the various memory element portions in which information is stored. A series of electrodes 46 are formed upon a face surface of the memory element 38 to permit connection with corresponding electrodes of a conventional, card reader assembly of a radio telephone. The memory element can be carried by a subscriber to a cellular, or other wireless, communication system and inserted into any radio telephone constructed to receive such a memory element.

If a subscriber to a cellular, or other wireless, communication system possesses two or more radio telephones, each operative to receive a portable memory element, such as the portable memory element 38, the subscriber can alternately use a selected one of the radio telephones by inserting the portable memory element 38 therein. Once inserted, data stored in the memory locations of the memory element, such as the electronic serial number, can be accessed. The subscriber thereby incurs only a single activation and maintenance fee while

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being permitted to utilize, alternately, any of many radio telephones to communicate by way of the cellular, or other wireless, communication system. A card member of another size, such as a D-Net-sized card member, is similar in function with the C-Net-sized card member and can be similarly illustrated.

Figure 3 illustrates functionally the information stored in the memory locations of the memory element 38 according to an embodiment of the present invention. The memory element 38 includes a directory 48 which is first accessed, in conventional manner, when data stored in the memory locations of the memory element 38 is to be accessed or retrieved. Selected memory locations of the memory element 38 are accessed by first addressing the directory 48.

In the embodiment of the memory element 38 illustrated in the figure, the memory element further includes a security subdirectory 52 which is further accessed when security-related information is accessed. An encryption key 54 is exemplary of security data stored in the memory element 38. The encryption key 54 is used to encrypt data prior to transmission at the radio telephone and to decrypt data transmitted to the radio telephone.

A listing of authorized operators 56 is also stored in the programmable memory element 38. A list of authorized operators indicate the carriers whose systems are authorized to be accessed during operation of the radio telephone. The memory locations addressed by way of the security directory and the listing of authorized operators is typically stored in the memory locations of

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the memory element upon activation of the subscriber's service with a cellular communication system.

Personal security data 58 and an abbreviated dialing list, i.e., a speed-calling list, 62 are also stored in the memory locations of the memory element 38. In an embodiment of the present invention, identification data 64, identifying the subscriber with the subscriber's personal identification information, such as physical characteristics and medical information, is also stored in memory locations of the memory element 38.

The personal security data 58, the abbreviated dialing list 62, and the identification data 64 can be stored, for instance, in EEPROM memory portions of the memory element 38 to permit updating of the information stored therein, when appropriate.

In one embodiment of the present invention, the data 58, the dialing list 62, and the identification data 64 is stored in the memory locations at the same time in which the other data is stored in other memory locations of the memory element 38. In another embodiment of the present invention, the data 58, dialing list 62, and identification data 64 are stored in the memory locations by the subscriber by way of appropriate interaction with, for example, the input keypad of a radio telephone. In this embodiment, the subscriber is able to update such user-defined data, whenever desired. Once stored in the memory locations, the data stored therein can be addressed and retrieved by accessing the directory 48.

During operation of an embodiment of the present invention, when a request for emergency assistance is requested by the subscriber, the identification data 64



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stored in the memory element 38 is automatically accessed and transmitted automatically to provide emergency dispatch personnel with such identification data. Because the identification data is automatically transmitted, emergency personnel are provided with the identification data even if the subscriber is unable to communicate properly such information to the emergency dispatch personnel.

Figure 4 illustrates a method, shown generally at 72, of operation of an embodiment of the present invention. The method 72 retrieves informational data of a subscriber when a request for emergency assistance is requested by the subscriber. The request is made by way of a radio telephone, such as the radio telephone 12 shown in Figure 1, and a programmable memory element, such as the memory element 38, is coupled to the radio telephone to form a portion thereof.

First, and as indicated by the decision block 74, a determination is made as to whether a request, e.g., entry of the digits "9-1-1", for emergency assistance has been entered. If not, a no branch is taken to program exit 76. If a request for emergency assistance has been entered, the yes branch is taken to decision block 76.

At the decision block 78, a determination is made as to whether positional information pertaining to the position of the subscriber when the request for emergency assistance is entered is available. If so, the yes branch is taken to block 80 whereat the format, by way of type of positional information, is identified. Thereafter, and as indicated by the block 82, a location field is populated with the positional information. If, positional

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information is not available, a no branch is taken from the decision block 78 to block 84 where the format and location field is populated with null values.

5 A determination is thereafter made, as indicated by the logic block 86, as to whether a user-defined memory-element portion of the programmable memory element includes medical information of the subscriber. If so, a yes branch is taken to block 88 and a medical information parameter is set to a "true" logical value.  
10 Then, and as indicated by block 92, a field is populated with medical information retrieved from the memory element. If, conversely, the no branch is taken from the logic block 86, the medical information parameter and medical information field is populated with null values,  
15 as indicated by the block 94.

Thereafter, and as indicated by the decision block 96, a determination is made as to whether the user-defined memory-element portion includes physical information of the subscriber. If so, a yes branch is taken to the block  
20 98 and a physical information parameter is set to a "true" logical value. Then, and as indicated by the block 102, a physical information is populated with physical information retrieved from the memory element. If the no branch is taken from the decision block 96, the physical  
25 information parameter and physical information field is populated with null values, as indicated by the block 104.

Thereafter, an emergency information data message is transmitted by the radio telephone, as indicated by the  
30 block 106.

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The operation of the method 72 automatically retrieves data from a portable memory element and causes transmission of such retrieved data merely upon detection of entry of an emergency request. The subscriber of the radio telephone is able to provide emergency personnel with the information stored in the memory element without further action on the subscriber's part. If the subscriber is unable otherwise to communicate to emergency personnel such information, the emergency personnel are still able to obtain the emergency information stored in the programmable memory element of the subscriber, and the emergency personnel are better able to facilitate a response to the emergency request. Figure 5 illustrates a message format, shown generally at 112, which is formed during operation of an embodiment of the present invention. The information generated during operation of the method 72, shown in Figure 4, forms a portion of the information formatted according to the message format 112. The message format is the general format defined for a personal communications system (PCS) 1900, wireless communication system.

The PCS 1900 system defines an emergency setup which defines a call message structure for a mobile-originated emergency call placed by a radio telephone operable in a PCS 1900 communication system. Other communication systems define other message formats and structures and the message format illustrated in Figure 5 is exemplary in nature.

The message format 112 includes a protocol discriminator 114, a transaction identifier 116, a message-type identifier 118, a bearer capability lock 122,

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and an extension information block 124. The data contained in the elements or blocks 114-122 are all defined in the aforementioned PCS 1900 systems. The extension information 124 is populated with the data generated during operation of the method 72, shown in Figure 4.

According to the protocol of operation of a radio telephone operable in the PCS 1900 system, a message formatted according to the message format 112 shown in Figure 5 is generated and transmitted responsive to entry of a request, such as entry of the digits "9-1-1", for emergency assistance. The informational data contained in the portable memory element can thereby be provided automatically, merely by entry of the request for the emergency assistance by the subscriber.

Figure 6 illustrates a portion of fixed-site equipment of a cellular communication system and the connection of such equipment to an emergency dispatch center 22, shown previously in Figure 1. A base station 16 which receives signals generated by a radio telephone is again shown in the figure. The base station 16 is here shown to be connected to the public service telephonic network 18 by way of a mobile switching center 128. The mobile switching center is coupled to an operation and maintenance center (OMC) 132 in conventional manner. The base station 16, mobile switching center 128, and OMC 132 form portions of a public land mobile network 20.

An emergency setup message transmitted according to, for example, the message format 112, is received by the base station 16 and supplied to the MSC 128. The extension information 124 formed of the informational data

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is provided to the OMC 132 where, for example, the information can be displayed. The incoming call is routed, in normal fashion, to the emergency dispatch center 22. The emergency dispatch center is able to determine the MSC 128 of the cellular communication system from which the call has originated. The emergency dispatch center is also provided with an indication that the MSC 128 supports the reception of the extension information 124. Dispatch personnel of the emergency dispatch center are able to inquire of the OMC 132 if additional informational data regarding the request for emergency assistance has been received. Responsive thereto, the OMC provides access to the dispatch personnel with the received informational data. Use of the informational data facilitates the dispatch of appropriate emergency personnel responsive to the request. An SS7 communication system, conventional in the art, encompasses the portion of the fixed-site equipment shown in Figure 6 according to one embodiment of the present invention. As an SS7 communication system supports an Integrated Service Digital Network (ISDN) User Part (ISUP), the extension information can be supplied directly to the emergency dispatch center 22 rather than to the OMC 132 by appropriate protocol support added to the ISUP. For instance, by extension of the ISUP, the extension information can be added as part of a calling party information field, analogous, e.g., to extensions to DTAP. The extension information can be, e.g., explicitly stated in the ISUP message, such as in the initial address message. In other embodiments, the switches ~~interconnecting the emergency information requester and~~

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the dispatch center can further store indications as to whether the network supports the transmission of the extension information in such manner. Such an embodiment obviates the need by the emergency personnel to separately  
5 access the OMC 132.

Figure 7 illustrates a radio telephone, shown generally at 212, of which another embodiment of the present invention forms a portion. Analogous to the radio telephone 12 shown in Figure 1, the radio telephone 212  
10 generates and transmits radio frequency signals upon a radio frequency channel to a fixed-site base station (not shown in the figure).

The radio telephone 212 is illustrated in the figure to include transceiver circuitry 224 having transmitter and receiver portions for transmitting and receiving  
15 signals by way of an antenna element 226. Operation of the radio telephone is controlled by control circuitry 228 which is coupled to the transceiver circuitry by way of lines 232. An operator of the radio telephone 212 inputs control commands and data to effectuate operation of the  
20 radio telephone by way of an input keypad 234 which is coupled to the control circuitry 228 by way of lines 236.

A portable memory element 238 is releasably connectable to the control circuitry 228 by way of lines  
25 242. The portable memory element 238 is similar in structure and function with the portable memory element 38 shown in preceding figures.

The radio telephone 212 further includes a global positioning receiver 244, operative in conventional manner  
30 in a global positioning system to determine the ~~latitudinal and longitudinal, or other positional,~~

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coordinates of the global positioning receiver 244. The global positioning receiver 244 is coupled to the control circuitry 228 by way of the lines 246.

5 The radio telephone 212 is operable in manners analogous to operation of the radio telephone 12 shown in Figure 1 to retrieve informational data stored at the portable memory element 238 responsive to entry of a request for emergency assistance by a subscriber. In this embodiment, the positional coordinates determined by the  
10 global positioning receiver 244 are also retrieved by the control circuitry 228.

Both the positional information and the informational data are provided to the transceiver circuitry 224 in a desired message format and transmitted automatically by  
15 the radio telephone 212. In this manner, emergency dispatch personnel are provided not only with informational data pertaining to the subscriber, but also with positional data identifying the physical location at which the request for emergency assistance has been  
20 initiated.

Operation of embodiments of the present invention facilitate the communication of at least informational data to an emergency dispatch center when a call to the emergency dispatch center is placed at the radio  
25 telephone. Because the information is transmitted automatically, information is provided to the emergency dispatch center even if the subscriber is unable otherwise to communicate with personnel of the emergency dispatch center.

30 Any radio telephone in which a memory element, such as the memory element 238, is inserted is automatically

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provided with the informational data associated with the subscriber. In the event that an emergency call is placed with the radio telephone, such informational data is automatically provided to an emergency dispatch center.

5 If the radio telephone further includes a global positioning receiver, precise, positional data is also provided to the emergency dispatch personnel.

10 Presently-preferred embodiments of the present invention have been described with a degree of particularity. The previous descriptions are of preferred examples for implementing the invention, and the scope of the invention should not necessarily be limited by this description. The scope of the present invention is defined by the following claims.



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## WHAT IS CLAIMED IS:

1. A device for providing informational data associated with a subscriber of a radio communication system to an emergency dispatch center by way of a mobile subscriber unit, the mobile subscriber unit operable at least to communicate telephonically with the emergency dispatch center responsive to a request entered by way of a mobile unit input element, said device comprising:

a memory element removably connectable to the mobile subscriber unit, said memory element for storing therein the informational data associated with the subscriber; and

an emergency request controller for detecting times in which the request to communicate telephonically with the emergency dispatch center is entered by way of the mobile subscriber unit, and responsive thereto, for transmitting the informational data stored at said memory element to the emergency dispatch center.

2. The device of claim 1 further comprising a global positioning receiver positioned together with the mobile subscriber unit, said global positioning receiver for generating positional data indicative of positioning of the mobile subscriber unit, and wherein said emergency request controller is further for transmitting the positional data generated by said global positioning receiver to the emergency dispatch center.

3. The device of claim 2 wherein said emergency request controller transmits the positional data generated by said global positioning receiver responsive to

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detection of the request to communicate with the emergency dispatch center automatically without additional action by the subscriber.

5           4.    The device of claim 1 wherein said memory element forms a portion of a SIM card.

          5.    The device of claim 4 wherein the informational data is stored at memory locations formatted to be user-  
10   defined memory locations of said SIM card.

          6.    The device of claim 4 wherein the informational data is stored at said SIM card prior to positioning of the SIM card at the mobile subscriber unit.

15           7.    The device of claim 4 wherein the informational data is stored at said SIM card subsequent to positioning of the SIM card at the mobile subscriber unit.

20           8.    The device of claim 1 wherein the informational data comprises medical information related to medical characteristics of the subscriber.

          9.    The device of claim 1 wherein the informational  
25   data comprises physical information related to physical characteristics of the subscriber.

          10.   The device of claim 1 wherein said emergency request controller transmits the informational data stored  
30   at said memory element responsive to detection of the

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request to communicate with the emergency dispatch center automatically without additional action by the subscriber.

5 11. The device of claim 1 wherein said memory element comprises a programmable memory element and wherein the informational data is entered for storage in said programmable memory element by way of the mobile subscriber unit transducer.

10 12. The device of claim 1 wherein said emergency request controller further converts the informational data into a selected format, said selected format identifying the informational data by data type and data amount.

15 13. A method for providing informational data associated with a subscriber of a radio communication system to an emergency dispatch center by way of a mobile subscriber unit, the mobile subscriber unit operable at least to communicate telephonically with the dispatch center responsive to a request entered by way of a mobile unit input element, said method comprising the steps of:

20

storing the informational data associated with the subscriber in a memory element removably connectable to the mobile subscriber unit;

25 detecting times in which the request to communicate telephonically with the emergency dispatch center is entered by way of the mobile; and

transmitting the informational data stored at the memory element during said step of storing to the emergency dispatch center responsive to detection during

30

~~said step of detecting of entry of the request to~~

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communicate telephonically with the emergency dispatch center.

14. The method of claim 13 wherein the informational  
5 data stored in the memory element during said step of storing is stored prior to connecting the memory element to the mobile subscriber unit.

15. The method of claim 13 wherein the informational  
10 data stored in the memory element during said step of storing is stored subsequent to connecting the memory element to the mobile subscriber unit.

16. The method of claim 13 wherein the mobile  
15 subscriber unit comprises an input keypad and wherein said step of detecting comprises detecting times in which a selected sequence of digits is entered by way of the input keypad.

20. The method of claim 13 wherein the mobile  
20 subscriber unit comprises an input keypad having an actuation key dedicated to requesting emergency assistance and wherein said step of detecting comprises detecting times 17 which the actuation key is actuated.

25. In a radio telephone having a SIM card  
releasably connectable therein, an improvement of a device for providing informational data associated with a subscriber of a radio communication system to an emergency  
30 dispatch center by way of a mobile subscriber unit  

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operable at least to communicate telephonically with the

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emergency dispatch center responsive to a request entered by way of the mobile unit input element, said device comprising:

5 selected memory locations of the SIM card for storing therein the informational data associated with the subscriber; and

10 an emergency request controller for detecting times in which the request to communicate telephonically with the emergency dispatch center is entered by way of the mobile subscriber unit, and responsive thereto, for transmitting the informational data stored at said memory element to the emergency dispatch center.

15 19. A SIM card for a radio telephone operable in a wireless communication network, said SIM card comprising:

an operational data memory location for storing operational data utilized during operation of the radio telephone to access the wireless communication network; and

20 a personal data memory location for storing personal data pertaining to a subscriber of telephonic service in the wireless communication network, the personal data retrievable when a request for emergency assistance is made by way of the radio telephone.

25

1 / 6

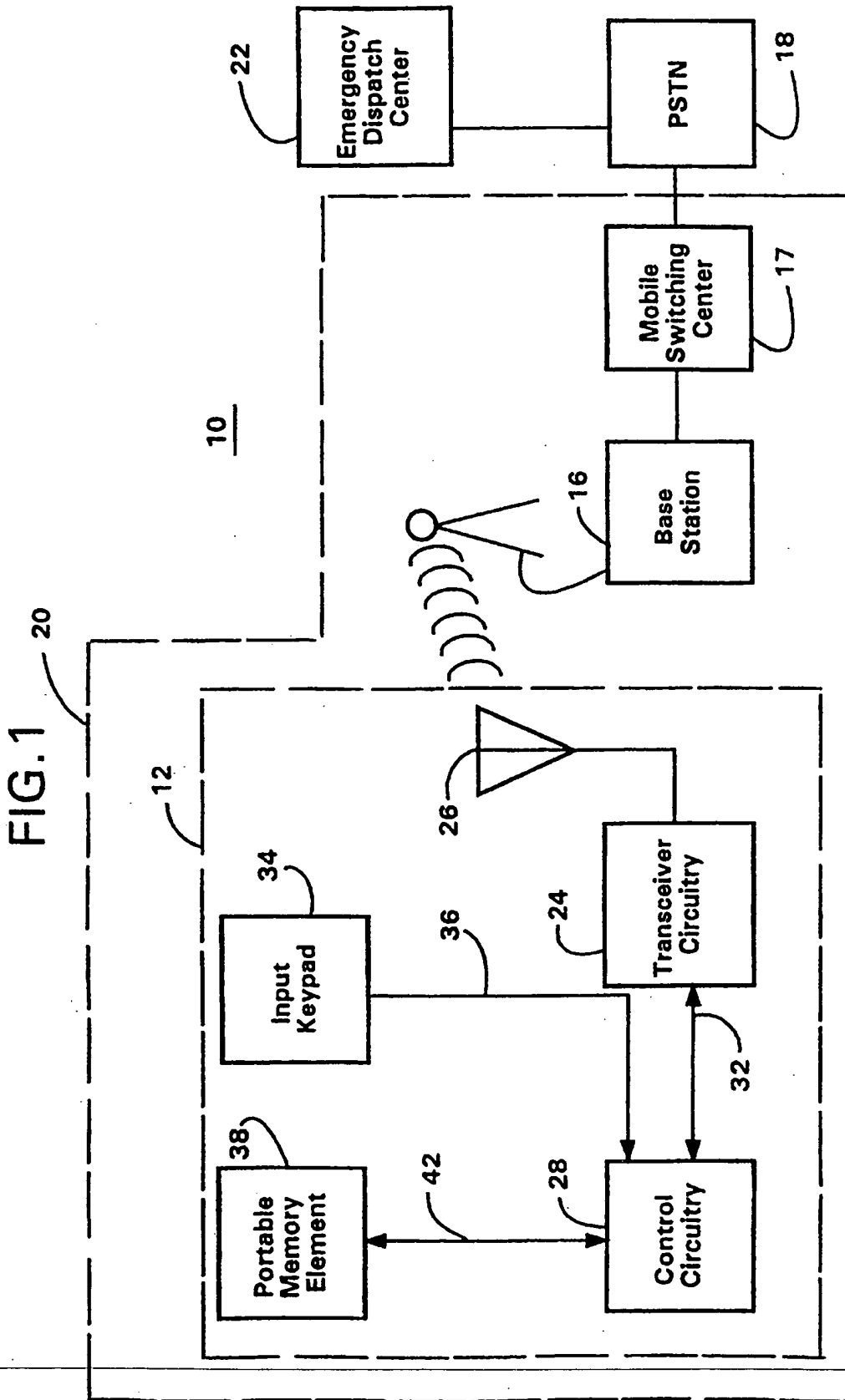


FIG.2

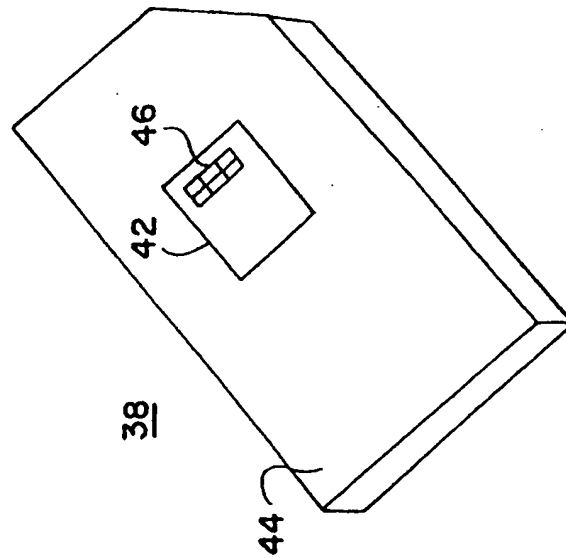
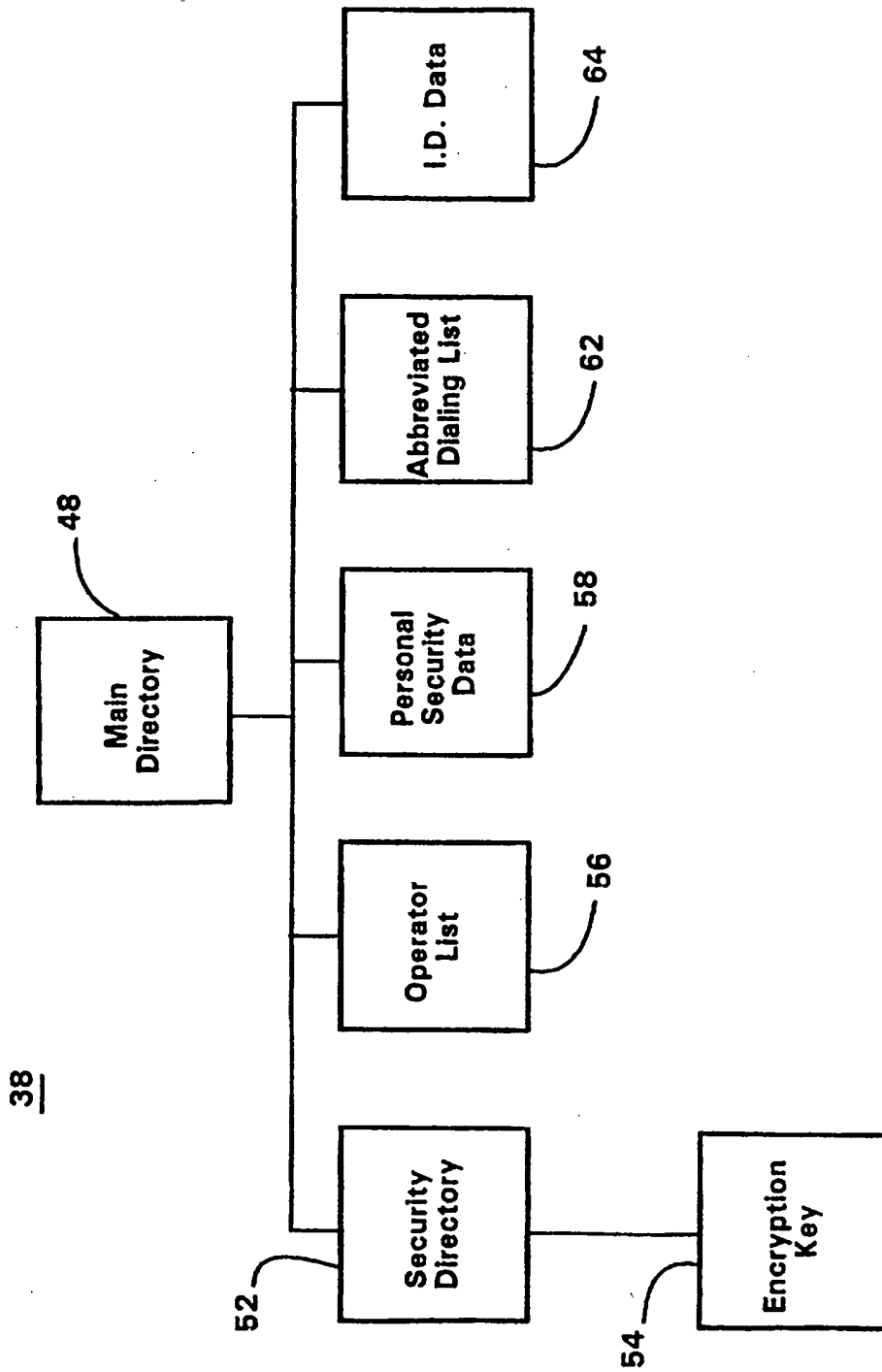


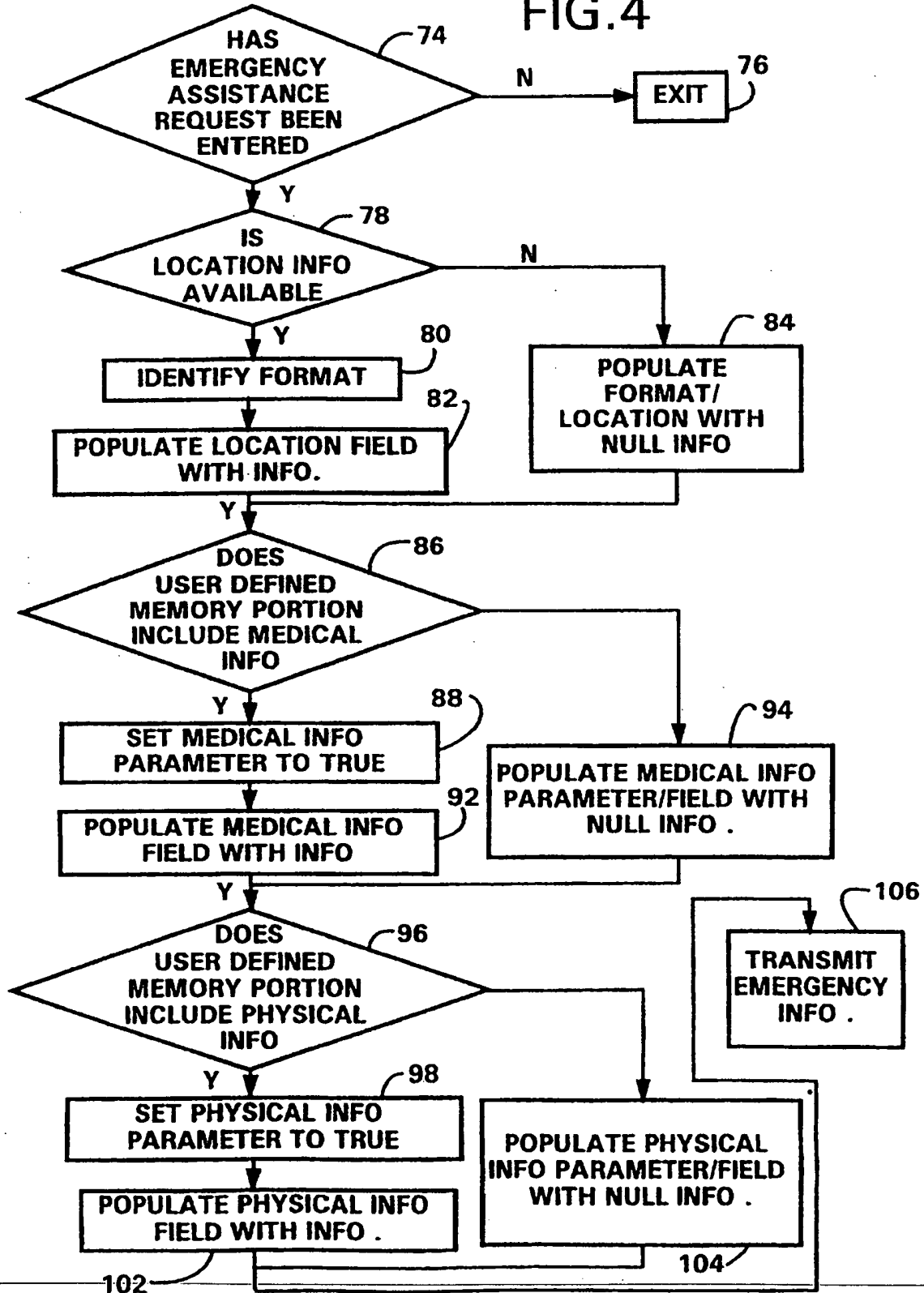
FIG. 3



38



FIG. 4



112

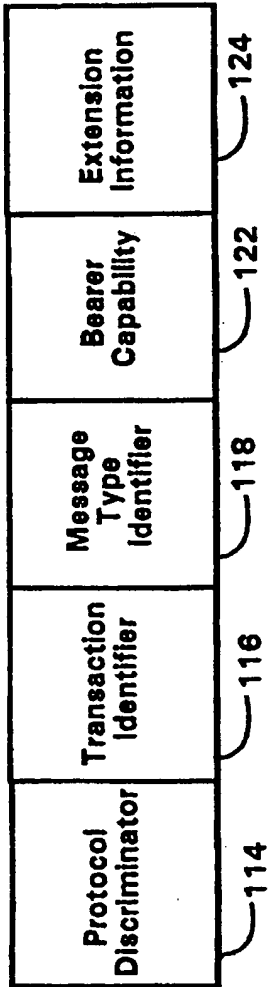


FIG. 5

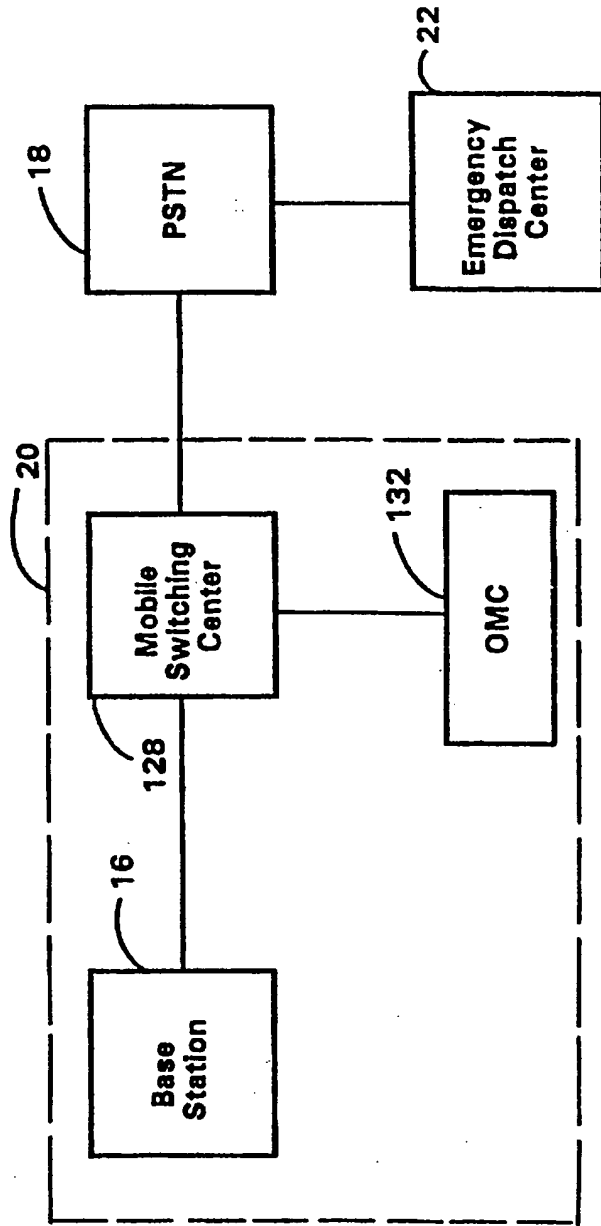
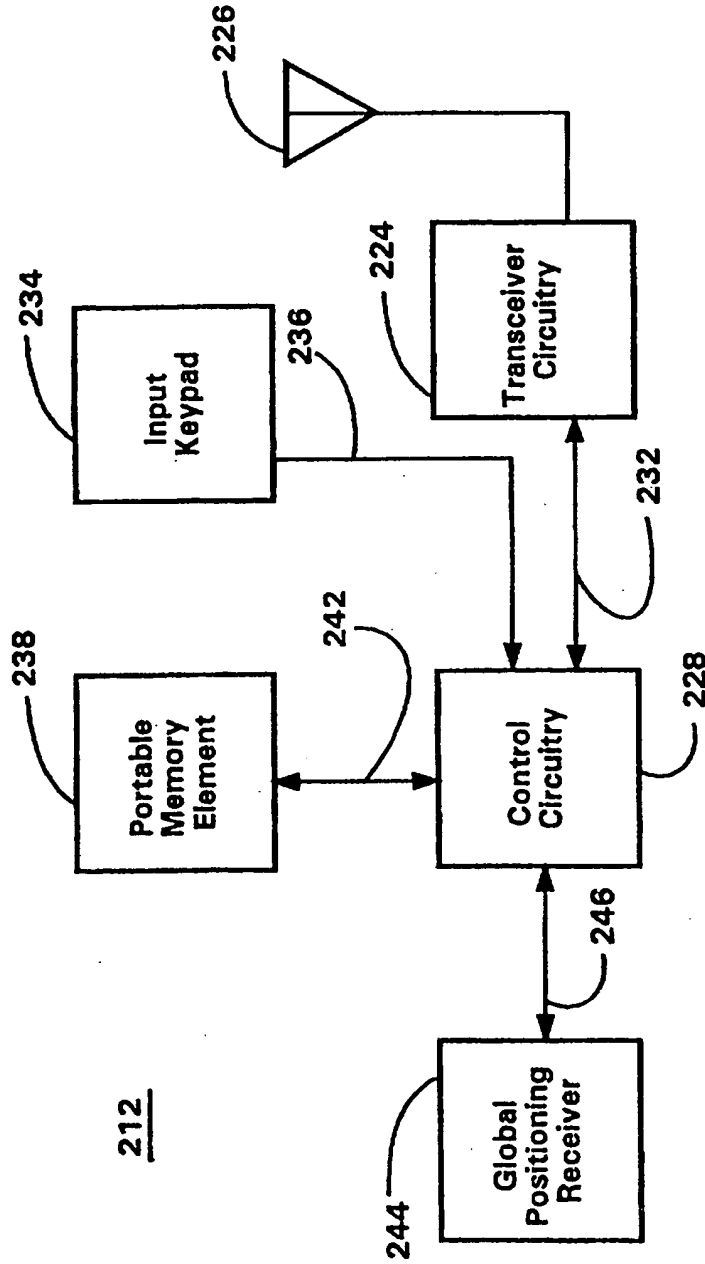


FIG. 6

FIG. 7



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/20419

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 H04Q7/22

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 H04Q

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

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A A	DE 44 21 508 A (BUREN ELKE VAN) 1 December 1994 see column 1, line 1 - column 4, line 30 ----- EP 0 679 041 A (SIEMENS AG) 25 October 1995 see abstract -----	1-11, 13-19 12  1-19

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

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

Date of the actual completion of the international search

25 April 1997

Date of mailing of the international search report

29.05.97

Name and mailing address of the ISA

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Authorized officer

Andersen, J.G.

# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 96/20419

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4421508 A	01-12-94	AU 7067394 A WO 9500860 A EP 0739491 A	17-01-95 05-01-95 30-10-96
EP 0679041 A	25-10-95	NONE	

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15886 U.S. PTO  
011006

<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	1503/105
	First Inventor	Eveline Wesby Van Swayy
	Title	Programmable Communicator
	Express Mail Label No.	EV 504303249 US

<p style="text-align: center;"><b>APPLICATION ELEMENTS</b> <i>See MPEP chapter 600 concerning utility patent application contents.</i></p> <p>1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b> (e.g., PTO/SB/17) <i>(Submit an original and a duplicate for fee processing)</i></p> <p>2. <input checked="" type="checkbox"/> <b>Applicant claims small entity status.</b> <i>See 37 CFR 1.27.</i></p> <p>3. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>25</u>] Both the claims and abstract must start on a new page <i>(For information on the preferred arrangement, see MPEP 608.01(a))</i></p> <p>4. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>3</u>]</p> <p>5. <b>Oath or Declaration</b> [Total Sheets <u>2</u>]  a. <input type="checkbox"/> Newly executed (original or copy)  b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))  <i>(for continuation/divisional with Box 18 completed)</i>  i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b>  Signed statement attached deleting inventor(s)  name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).</p> <p>6. <input checked="" type="checkbox"/> <b>Application Data Sheet.</b> See 37 CFR 1.76</p> <p>7. <input type="checkbox"/> <b>CD-ROM or CD-R</b> in duplicate, large table or  <b>Computer Program (Appendix)</b>  <input type="checkbox"/> Landscape Table on CD</p> <p>8. <b>Nucleotide and/or Amino Acid Sequence Submission</b>  <i>(if applicable, items a. - c. are required)</i>  a. <b>Computer Readable Form (CRF)</b>  i. <input type="checkbox"/> Computer Readable Form (CRF)  ii. <input type="checkbox"/> Transfer Request (37 CFR 1.821(e))  b. <b>Specification Sequence Listing on:</b>  i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or  ii. <input type="checkbox"/> Paper  c. <input type="checkbox"/> Statements verifying identity of above copies</p>	<p><b>ADDRESS TO:</b> Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450</p> <p style="text-align: center;"><b>ACCOMPANYING APPLICATION PARTS</b></p> <p>9. <input type="checkbox"/> <b>Assignment Papers</b> (cover sheet &amp; document(s)) Name of Assignee _____</p> <p>10. <input type="checkbox"/> <b>37 CFR 3.73(b) Statement</b> <input type="checkbox"/> <b>Power of Attorney</b> <i>(when there is an assignee)</i></p> <p>11. <input type="checkbox"/> <b>English Translation Document</b> <i>(if applicable)</i></p> <p>12. <input checked="" type="checkbox"/> <b>Information Disclosure Statement</b> (PTO/SB/08 or PTO-1449)  <input checked="" type="checkbox"/> Copies of foreign patent documents, publications, &amp; other information</p> <p>13. <input type="checkbox"/> <b>Preliminary Amendment</b></p> <p>14. <input checked="" type="checkbox"/> <b>Return Receipt Postcard</b> (MPEP 503) <i>(Should be specifically itemized)</i></p> <p>15. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b> <i>(if foreign priority is claimed)</i></p> <p>16. <input type="checkbox"/> <b>Nonpublication Request</b> under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</p> <p>17. <input type="checkbox"/> <b>Other:</b> _____</p>
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113277 U.S. PTO  
11/329212

011006

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

Continuation     Divisional     Continuation-in-part (CIP)    of prior application No.: 10/296,571

Prior application information: Examiner Nguyen, Nam V.    Art Unit: 2635

**19. CORRESPONDENCE ADDRESS**

The address associated with Customer Number: 002101    OR     Correspondence address below

Name			
Address			
City	State	Zip Code	
Country	Telephone	Email Address	
Signature	<i>Robert M. Asher</i>		Date
Name (Print/Type)	Robert M. Asher		Registration No. (Attorney/Agent)
			01/10/2006 30,445

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# FEE TRANSMITTAL

## For FY 2005

Complete if Known

Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

Application Number	
Filing Date	
First Named Inventor	Eveline Wesby Van Swaay
Examiner Name	
Art Unit	
Attorney Docket No.	1503/106

### METHOD OF PAYMENT (check all that apply)

Check  Credit Card  Money Order  None  Other (please identify): \_\_\_\_\_

Deposit Account Deposit Account Number: 19-4972 Deposit Account Name: Bromberg & Sunstein LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

Charge fee(s) indicated below  Charge fee(s) indicated below, except for the filing fee

Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17  Credit any overpayments

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### FEE CALCULATION

#### 1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	500.00
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

#### 2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims
20 - 20 or HP =	0	x	0.00	

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
2 - 3 or HP =	0	x	0.00

HP = highest number of independent claims paid for, if greater than 3.

#### 3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
28	- 100 =	-72 / 50 =	125.00	0.00

#### 4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount) Fees Paid (\$)

Other (e.g., late filing surcharge): \_\_\_\_\_

#### SUBMITTED BY

Signature		Registration No. (Attorney/Agent)	30,445	Telephone	617-443-9292
Name (Print/Type)	Robert M. Asher	Date	January 10, 2006		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



Practitioner's Docket No. 1503/105

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Eveline Wesby Van Swaay

Application No.: Not yet assigned  
Filed: Herewith  
For: Programmable Communicator

Group No.: Not yet assigned  
Examiner: Not yet assigned

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

EXPRESS MAIL CERTIFICATE

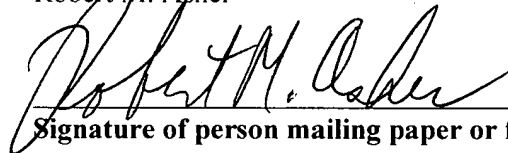
"Express Mail" label number EV 504303249 US  
Date of Deposit 01/10/2006

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Utility patent application

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10, on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Robert M. Asher



Signature of person mailing paper or fee

01503/00001 458523.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Eveline Wesby Van Swaay

Application No.: 10/296,571
Filed: January 21, 2003
For: Programmable Communicator

Group No.: 2635
Examiner: Nguyen, Nam V.

Mail Stop Ammendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

COPY

AMENDMENT, PETITION AND FEE FOR EXTENSION OF TIME TO MAINTAIN PARENT CASE THAT IS TO BE ABANDONED WHEN FILING NEW APPLICATION CLAIMING ITS BENEFIT

- 1. The amendment in this case is a bona fide attempt by applicant to respond and to advance this application to final action. It comprises a separately filed continuation application.

A copy of this amendment and petition is being filed with the papers constituting the filing of the separately filed application.

- 2. This is a petition under 37 C.F.R. section 1.136(a) for an extension of time to respond to the Office Action mailed July 11, 2005.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10\*
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37 C.F.R. § 1.8(a)

with sufficient postage as first class mail.

37 C.F.R. § 1.10\*

as "Express Mail Post Office to Addressee" Mailing Label No. (mandatory)

TRANSMISSION

facsimile transmitted to the Patent and Trademark Office, (703)

Signature (Handwritten signature of Robert M. Asher)

Date: January 10, 2006

Robert M. Asher
(type or print name of person certifying)

\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

3. Please abandon this application conditioned upon the granting of the petition and the granting of a filing date to the continuing application, so as to make the continuing application copending with this application. (*Notice of May 13, 1983, 1031 O.G. 11-12*).

4. Applicant is a small entity.

The statement has already been filed in the parent application. This status is still proper and its benefit under 37 C.F.R. section 1.28(a) is hereby claimed.

5. Extension requested

The proceedings herein are for a patent application and the provisions of 37 C.F.R. section 1.136 apply.

Applicant petitions for an extension of three months time under 37 C.F.R. section 1.136(a) (fees: 37 C.F.R. section 1.17(a)(1)-(4)) for three months:

Fee: \$510.00

If an additional extension of time is required, please consider this a petition therefor.


6. Fee Payment

Attached is a check in the sum of \$510.00.

7. Fee Deficiency

The Office is hereby authorized to charge Deposit Account No. 19-4972 any additional fees that may be required by this paper.

Date: January 10, 2006



Robert M. Asher  
Registration No. 30,445  
BROMBERG & SUNSTEIN LLP  
125 Summer Street  
Boston, MA 02110-1618  
US  
617-443-9292  
Customer No. 002101

01503/00104 458490.1

15886 U.S. PTO  
011006

<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	1503/105
	First Inventor	Eveline Wesby Van Sway
	Title	Programmable Communicator
	Express Mail Label No.	EV 504303249 US

<p style="text-align: center;"><b>APPLICATION ELEMENTS</b> <i>See MPEP chapter 600 concerning utility patent application contents.</i></p> <p>1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b> (e.g., PTO/SB/17) <i>(Submit an original and a duplicate for fee processing)</i></p> <p>2. <input checked="" type="checkbox"/> <b>Applicant claims small entity status.</b> <i>See 37 CFR 1.27.</i></p> <p>3. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>25</u>] Both the claims and abstract must start on a new page <i>(For information on the preferred arrangement, see MPEP 608.01(a))</i></p> <p>4. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>3</u>]</p> <p>5. <b>Oath or Declaration</b> [Total Sheets <u>2</u>]  a. <input type="checkbox"/> Newly executed (original or copy)  b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))  <i>(for continuation/divisional with Box 18 completed)</i>  i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b>  Signed statement attached deleting inventor(s)  name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).</p> <p>6. <input checked="" type="checkbox"/> <b>Application Data Sheet.</b> See 37 CFR 1.76</p> <p>7. <input type="checkbox"/> <b>CD-ROM or CD-R</b> in duplicate, large table or  <b>Computer Program</b> (Appendix)  <input type="checkbox"/> Landscape Table on CD</p> <p>8. <b>Nucleotide and/or Amino Acid Sequence Submission</b>  <i>(if applicable, items a. - c. are required)</i>  a. <b>Computer Readable Form (CRF)</b>  i. <input type="checkbox"/> Computer Readable Form (CRF)  ii. <input type="checkbox"/> Transfer Request (37 CFR 1.821(e))  b. <b>Specification Sequence Listing on:</b>  i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or  ii. <input type="checkbox"/> Paper  c. <input type="checkbox"/> Statements verifying identity of above copies</p>	<p><b>ADDRESS TO:</b> Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450</p> <p style="text-align: center;"><b>ACCOMPANYING APPLICATION PARTS</b></p> <p>9. <input type="checkbox"/> <b>Assignment Papers</b> (cover sheet &amp; document(s))  Name of Assignee _____</p> <p>10. <input type="checkbox"/> <b>37 CFR 3.73(b) Statement</b> <input type="checkbox"/> <b>Power of Attorney</b>  <i>(when there is an assignee)</i></p> <p>11. <input type="checkbox"/> <b>English Translation Document</b> <i>(if applicable)</i></p> <p>12. <input checked="" type="checkbox"/> <b>Information Disclosure Statement</b> (PTO/SB/08 or PTO-1449)  <input checked="" type="checkbox"/> Copies of foreign patent documents, publications, &amp; other information</p> <p>13. <input type="checkbox"/> <b>Preliminary Amendment</b></p> <p>14. <input checked="" type="checkbox"/> <b>Return Receipt Postcard</b> (MPEP 503)  <i>(Should be specifically itemized)</i></p> <p>15. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b>  <i>(if foreign priority is claimed)</i></p> <p>16. <input type="checkbox"/> <b>Nonpublication Request</b> under 35 U.S.C. 122(b)(2)(B)(i).  Applicant must attach form PTO/SB/35 or equivalent.</p> <p>17. <input type="checkbox"/> <b>Other:</b> _____</p>
---	--

113277 U.S. PTO  
11/329212

011006

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

Continuation     Divisional     Continuation-in-part (CIP)    of prior application No.: 10/296,571

Prior application information: Examiner Nguyen, Nam V.    Art Unit: 2635

**19. CORRESPONDENCE ADDRESS**

The address associated with Customer Number: 002101    OR     Correspondence address below

Name				
Address				
City	State	Zip Code		
Country	Telephone	Email Address		

Signature		Date	01/10/2006
Name (Print/Type)	Robert M. Asher	Registration No. (Attorney/Agent)	30,445

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.  
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15866  
011006

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Effective on 12/08/2004.  
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

# FEE TRANSMITTAL

## For FY 2005

### Complete if Known

Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

Application Number	
Filing Date	
First Named Inventor	Eveline Wesby Van Swaay
Examiner Name	
Art Unit	
Attorney Docket No.	1503/106

### METHOD OF PAYMENT (check all that apply)

Check  Credit Card  Money Order  None  Other (please identify): \_\_\_\_\_

Deposit Account Deposit Account Number: 19-4972 Deposit Account Name: Bromberg & Sunstein LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

Charge fee(s) indicated below  Charge fee(s) indicated below, except for the filing fee

Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17  Credit any overpayments

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### FEE CALCULATION

#### 1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	500.00
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

#### 2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

**Total Claims**      **Extra Claims**      **Fee (\$)**      **Fee Paid (\$)**

20 - 20 or HP = 0 x = 0.00

HP = highest number of total claims paid for, if greater than 20.

**Indep. Claims**      **Extra Claims**      **Fee (\$)**      **Fee Paid (\$)**

2 - 3 or HP = 0 x = 0.00

HP = highest number of independent claims paid for, if greater than 3.

#### 3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets**      **Extra Sheets**      **Number of each additional 50 or fraction thereof**      **Fee (\$)**      **Fee Paid (\$)**

28 - 100 = -72 / 50 = (round up to a whole number) x 125.00 = 0.00

#### 4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)      **Fees Paid (\$)**

Other (e.g., late filing surcharge): \_\_\_\_\_

#### SUBMITTED BY

Signature		Registration No. (Attorney/Agent)	30,445	Telephone	617-443-9292
Name (Print/Type)	Robert M. Asher	Date	January 10, 2006		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Practitioner's Docket No. 1503/105

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Eveline Wesby Van Swaay

Application No.: Not yet assigned  
Filed: Herewith  
For: Programmable Communicator

Group No.: Not yet assigned  
Examiner: Not yet assigned

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

EXPRESS MAIL CERTIFICATE

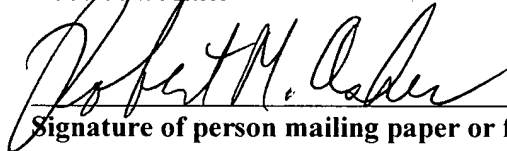
"Express Mail" label number EV 504303249 US  
Date of Deposit 01/10/2006

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Utility patent application

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Robert M. Asher



Signature of person mailing paper or fee

01503/00001 458523.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Eveline Wesby Van Swaay

Application No.: 10/296,571
Filed: January 21, 2003
For: Programmable Communicator

Group No.: 2635
Examiner: Nguyen, Nam V.

Mail Stop Ammendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

COPY

AMENDMENT, PETITION AND FEE FOR EXTENSION OF TIME TO MAINTAIN PARENT CASE THAT IS TO BE ABANDONED WHEN FILING NEW APPLICATION CLAIMING ITS BENEFIT

- 1. The amendment in this case is a bona fide attempt by applicant to respond and to advance this application to final action. It comprises a separately filed continuation application.

A copy of this amendment and petition is being filed with the papers constituting the filing of the separately filed application.

- 2. This is a petition under 37 C.F.R. section 1.136(a) for an extension of time to respond to the Office Action mailed July 11, 2005.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10\*
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37 C.F.R. § 1.10\*

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facsimile transmitted to the Patent and Trademark Office, (703)

Signature (Handwritten signature of Robert M. Asher)

Date: January 10, 2006

Robert M. Asher
(type or print name of person certifying)

\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation. although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

3. Please abandon this application conditioned upon the granting of the petition and the granting of a filing date to the continuing application, so as to make the continuing application copending with this application. (*Notice of May 13, 1983, 1031 O.G. 11-12*).

4. Applicant is a small entity.

The statement has already been filed in the parent application. This status is still proper and its benefit under 37 C.F.R. section 1.28(a) is hereby claimed.

5. Extension requested

The proceedings herein are for a patent application and the provisions of 37 C.F.R. section 1.136 apply.

Applicant petitions for an extension of three months time under 37 C.F.R. section 1.136(a) (fees: 37 C.F.R. section 1.17(a)(1)-(4)) for three months:

Fee: \$510.00

If an additional extension of time is required, please consider this a petition therefor.

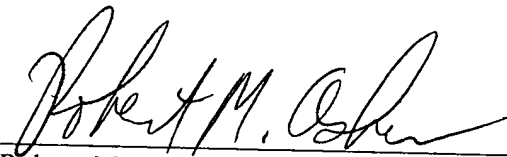
6. Fee Payment

Attached is a check in the sum of \$510.00.

7. Fee Deficiency

The Office is hereby authorized to charge Deposit Account No. 19-4972 any additional fees that may be required by this paper.

Date: January 10, 2006



Robert M. Asher  
Registration No. 30,445  
BROMBERG & SUNSTEIN LLP  
125 Summer Street  
Boston, MA 02110-1618  
US  
617-443-9292  
Customer No. 002101

01503/00104 458490.1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION APPLICATION FOR UNITED STATES PATENT

FOR

**PROGRAMMABLE COMMUNICATOR**

Inventor(s):

**Eveline Wesby Van Swaay**  
Camden House  
School Lane  
Tiddington  
Stratford-upon-Avon  
CB37 7AJ  
United Kingdom

Attorney Docket: 01503/00105  
(01503/00105 458414.1 )

Attorneys:  
BROMBERG & SUNSTEIN LLP  
125 Summer Street  
Boston, MA 02110  
(617) 443-9292

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONTINUATION APPLICATION FOR UNITED STATES PATENT

FOR

**PROGRAMMABLE COMMUNICATOR**

Inventor(s):

**Eveline Wesby Van Swaay**  
Camden House  
School Lane  
Tiddington  
Stratford-upon-Avon  
CB37 7AJ  
United Kingdom

Attorney Docket: 01503/00105  
(01503/00105 458414.1)

Attorneys:  
BROMBERG & SUNSTEIN LLP  
125 Summer Street  
Boston, MA 02110  
(617) 443-9292

Attorney Docket: 01503/00105

**Programmable Communicator****Cross Reference to Related Applications**

This is a continuation application of U.S. Patent Application No. 10/296,571 that has an official filing date of January 21, 2003, and which is a National Phase filing of and claims priority to PCT/EP01/05738 filed on May 18, 2001, which further claims priority from Finland Application 20001239, filed May 23, 2000, all of which are hereby incorporated by reference herein in their entirety.

**Background of the Invention**

The invention relates to a programmable wireless communications apparatus. More particularly, it relates to a programmable wireless communications apparatus, which can provide an improved means of communication between children and their parents, between elderly persons and caring relatives, and between mentally less-able individuals and supervising adults. In addition, the invention provides a solution for smart clothes applications, which may comprise a telecommunications means within the lining of a jacket or other article of clothing, as well as a solution for user-programmable data tags which convey information from remotely located devices such as vending machines. The invention relates to and significantly improves upon a previously filed patent application claiming Finnish priority of Sep. 9, 1997 entitled a Portable Hotlink Communicator published as international patent application PCT/GB98/02715.

In this previously filed application, is taught the invention of using a mobile phone comprising a programmable identity module such as a SIM card, in the context of the GSM telecommunications standard, to program the number of any mobile or fixed telephone to which the Hotlink communicator, comprising a similar type of programmable identity module, is to be linked. Existing and known methods of communication between the mobile phone and Hotlink communicator for the purpose of programming comprise the obvious choice of data calls such as the Short Message Service in the GSM telecommunications

standard. Alternatively a PDA type communicator might call up a web page to instruct a network element to program the programmable identity module of the Hotlink with the number of any fixed or mobile telephone to which the Hotlink communicator is to be linked.

This use of a separate mobile phone to program the number to which the Hotlink may call is particularly useful and convenient should a parent wish to change the number if the parent must leave shortly and want that the Hotlink is connected immediately to the mobile phone or fixed line of another parent or supervising neighbour.

The current invention builds upon the teaching of this earlier application and extends the concept significantly that it has more general and suitable application to both the child Hotlink communicator and also to the field of programmable wireless data communication tags for the purpose of providing information about the status of a vending machine or other piece of technical equipment such as a home appliance or a device to monitor whether a door is open or closed.

In addition to this, the current invention relates directly to programmable wireless data communication tags, which comprise the means to be interfaced directly with other technical equipment such that each tag can be programmed remotely by any means to be linked to any fixed or mobile telephone to enable data to be sent to or from the device and to allow a person to make a voice call connection to the linked telephone.

Today parents are concerned whether to provide a young child with a mobile phone or not. The concern relates to the cost of the mobile phone should it be lost or stolen and also to the cost of the use of the mobile phone. Clearly there is a need to provide a means to limit the cost of calling and also to provide a means to prevent the child dialling overseas numbers for extensive periods of time.

In the context of mobile phone operators, there exists a need to provide a simple and effective communication device, which can provide the means for family tariffing such that subscriptions for children can be related to the subscriptions of their parents' mobile phones.

An improved child Hotlink communicator, which restricts the usage of the mobile phone and thereby does not generate high charges through uncontrolled calling, is clearly a solution to the family tariffing challenge.

Parents are often concerned about the whereabouts of their children and new positioning technologies are being developed for locating mobile phones. These solutions include self-positioning solutions and remote positioning solutions. One example of a self-positioning solution includes the satellite-based Global Positioning System technology in which the mobile phone comprising a GPS signal processing circuit is able to determine the coordinates of its own position by processing signals received from satellites and communicate these coordinates to a location centre associated with the network. One example of a remote positioning solution is the method taught in U.S. Pat. No. 5,051,741 claiming priority of Mar. 27, 1990 in which the mobile phone is paged and caused to transmit a response which is processed by communication stations such as time-of-arrival measurement units associated with the network of master stations or base stations.

This remote positioning method has the advantage that the position of the mobile phone can be determined by making use of existing signalling between the mobile phone and the network without requiring any changes to the mobile phone, which would increase its cost. The generic network-based, remote-positioning architecture method of U.S. Pat. No. 5,051,741 may make use of time of arrival methods or phase difference calculations to increase the resolution of the area or sector within which the mobile phone is located.

While the location of the mobile phone itself is a good indication of the present location of the person carrying the mobile phone, an improvement would be a means to lock the mobile phone to the child, such that use of the mobile phone positioning technologies would then determine the position of the child.

In addition to these concerns about the failures of existing mobile communications technology to provide an improved and more secure method of instant communication between a parent and a young child, and the means to determine the position of the child,

there is additional concern that the battery of the communicator may drain its power without the parent knowing, or may be removed, which would prevent the communicator from receiving calls or dialling to the programmed fixed or mobile number to which the communicator is linked.

In addition to these specific communication problem needs, there is a growing yet unsubstantiated concern about the potentially harmful effect of electromagnetic radiation from mobile phones upon the developing brains of young children. Within this context, there is an opportunity to design a communication device for children, which positions the radiating electromagnetic field of a communication device away from the close proximity of the brain. In this regard, parents who maintain the belief that mobile telephones present a health risk due to the radiating antenna may rest secure in the knowledge that this risk can be significantly reduced.

In a separate context, there exists a growing need for a mobile telephone solution, which is cost effective to manufacture, but which is versatile such that it can form the basis for a smart clothes tag or communications application platform. In this context the requirement is for an embedded mobile phone platform comprising no keypad or display, which may be sewn into the lining of a jacket, or other article of clothing, having only the call button protruding and a simple pin connection to recharge the battery. The problem with prior art solutions is that unless the smart clothes tag can be user-programmable to call any fixed or mobile number by making use of an acceptable method such as via an SMS data call or via a BlueTooth radio transmission from a mobile phone or intelligent PDA, the solution is impractical to implement.

In security applications where emergency service personnel carry hand-held primary communications devices such as conventional mobile phones, a back-up communications device such as a smart clothes embedded tag can be of great value in the instance that the primary communications device is lost or broken.

In sports areas such as on lakes where there may be people using canoes, a smart clothes

communications tag embedded in a life vest may serve to alert a central control point that a person is in difficulty and also to alert other persons in the area to go to their rescue.

In an additional application area, skiers in difficulty would benefit from a smart clothes user-programmable communications tag attached to their clothing, which is pre-programmed to be linked with a fixed or mobile telephone and need only have its protruding button pressed to make communication with a central alarm point.

In an additional application area there exists the need for a user-programmable remote wireless communications data tag, which can be used to relay information about the status of a remote piece of technical equipment such as a vending machine. Home networks could be simplified by making use of the existing mobile network infrastructure to relay data about the status of a home appliance or to indicate whether a door is open or closed. Packet switched technologies such as GPRS may be used as the radio access technology to communicate the status of the technical equipment.

In an additional application area there exists the need for a versatile communications platform, which can be combined with remote health monitoring technology to assist doctors with remote diagnosis of patients.

In an additional application there is the need for a versatile communications which is able to work effectively when the network is temporarily overloaded such that it has the means to store a sound message as a sound byte or convert it using voice recognition software such that it can be forwarded as soon as the network capacity becomes less loaded.

Further to these limitations of existing technologies, and so far as is known, no portable communication apparatus is presently available which serves to offer an improved programmable communicator which is directed towards the specific needs of this problem area as outlined.

### **Objects of the Invention**

Accordingly, it is an object of the present invention to provide an improved programmable communications apparatus, which can be remotely programmed by any mobile phone or IP device such that it can be linked to any particular fixed or mobile phone or IP device.

It is a further object of the present invention to provide a programmable communications apparatus, which may be programmed at close range using infrared light or a BlueTooth radio connection, or via a terminal-to-terminal network based data call such as the GSM SMS short message service or via a GPRS packet data communication.

It is a further object of the present invention to provide a programmable communications apparatus, which may be programmed by a mobile or fixed device which is able to call up an Internet web page and which comprises the means to instruct the network to reprogram the communications apparatus with the mobile or fixed number to which the programmable communications device is to be linked.

It is a further object of the present invention to provide a programmable communications apparatus, which may be programmed via the Internet such that the network communicates with a device in the vicinity of the programmable communications apparatus which itself causes the said apparatus to be programmed using any means such as wireless communication, infrared light or a BlueTooth radio link.

It is a further object of the present invention to provide a plurality of programmable communications apparatuses, which may be simultaneously programmed by a mobile or fixed device which is able to call up an Internet web page and select one or more apparatuses of the said plurality and cause each of the selected number of apparatuses to be linked to the identical mobile or fixed telephone.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a processing means to process coded transmissions and permit only transmissions comprising a coded number, which determines the authenticity of the



message, to be allowed to program the number to which the said apparatus be linked.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a wrist strap, or an attachment such as in the case of the smart clothes application, and a first alarm means which can be programmed such that it can cause a message to be sent to the fixed or mobile number to which the said apparatus is linked in the case that the wrist strap be broken or undone or in the case that the said attachment be broken or displaced from an initial position of equilibrium.

It is a further object of the present invention to provide a programmable communications apparatus, which may have a separate pressure sensitive means or displaceable means which becomes activated in the pressed position or displaced position respectively such that it is able to generate an alarm or data message when pressure is removed or when the displacement returns to the non-displaced position. Such a feature serves, by way of example, to replace the need for the wrist strap feature of the previous object such that when the wrist worn communicator is removed from the wrist the pressure sensitive means or displaceable means can provide the required alarm message.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a heat sensor, which can detect that the communicator is adjacent to a heat source such as the skin of a child and the means to generate an alarm message if the heat source is removed.

It is a further object of the present invention to provide a programmable communications apparatus, which has the means to detect any other detectable physical characteristic of the human skin, which may be used to trigger an alarm if the means is moved away from the skin.

It is a further object of the present invention to provide a programmable communications apparatus for a security application, which comprises an infrared heat detector and which is able to generate an alarm message if a change in the level of infrared radiation is detected.

It is a further object of the present invention to provide a programmable communications apparatus, which may form part of a home network of devices, which is used to monitor a domestic appliance such as a washing machine or a device to monitor whether a door or window is open or closed and to react to a change in status of said appliance or device by sending an alarm message or data message to a linked fixed or mobile telephone or internet IP address to indicate a current status of said appliance or device. In addition the said apparatus may be incorporated in a bicycle frame or attached to a bicycle for monitoring movement of the bicycle.

It is a further object of the present invention to provide a programmable communications apparatus, which has a memory means to store sound as a sound byte for a certain period of time such as the voice of the child wearing the programmable communicator and the means to send this sound to the telephone number to which the said apparatus is linked.

It is a further object of the present invention to provide a programmable communications apparatus, which has a means to store and transmit a sound byte in response to receiving a sound above a predetermined threshold such that a person who is in distress may shout out and the distress call is processed by the programmable communicator and forwarded to the fixed or mobile telephone or IP address to which the said communicator is linked.

It is a further object of the present invention to provide a programmable communications apparatus, which is able to make a call to a linked fixed or mobile telephone or IP address and which if it detects that the telephone number is engaged or does not answer or that the IP address is invalid, the said apparatus has the means to select any other telephone number or IP address in the permitted callers list such that it can be connected to said other telephone or IP device.

It is a further object of the present invention to provide a programmable communications apparatus, which is able to store a sound byte or store a data record and send the sound byte or data record to any other telephone number or IP address in the permitted callers list after a

certain interval of time in the instance that the primary number or IP address is engaged or connection is not able to be made at that time due to the network capacity not being sufficient at that time. The feature may also include a continuous retry feature such that the attempt to send the sound byte or data record is continued until the sound byte or data record is successfully sent.

It is a further object of the present invention to provide a programmable communications apparatus, which has the means to convert a voice message into text and send this as a data message to a fixed or mobile telephone or IP address to which the said apparatus is linked.

It is a further object of the present invention to provide a programmable communications apparatus, which is able to receive data from a plurality of data monitoring devices, which may be connected by any wired or wireless means, and that each of said devices has an associated status condition, such that the programmable communications apparatus can transmit data from said devices on request or periodically to a fixed or mobile telephone or IP address to which the said apparatus is linked.

It is a further object of the present invention to provide a programmable communications apparatus, in which the said first alarm means may communicate directly with a central communications point in the network.

It is a further object of the present invention to provide a programmable communications apparatus, in which the said first alarm means may communicate directly with a web page and write information to that page or cause an E-mail to be sent to a specific address.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a second alarm means, which can be programmed to cause a message to be sent to the fixed or mobile number to which the said apparatus is linked in the case that the battery is low in power or in the case that the battery is removed or in the case that the communicator be switched off.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a second alarm means, which can be programmed to send a message periodically comprising any status message such as the current power status of the battery.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a battery charger adapter-pin such that the apparatus can make use of suitable battery chargers of other mobile phones.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises the means to be interrogated remotely by another fixed or mobile telephone or network connected device, such that different codes are used to obtain different data from the said apparatus. In the context of remote health monitoring, by way of example, a doctor could send different codes from her mobile terminal and obtain different data on blood pressure and the heart rate of the person wearing the apparatus associated with a health monitoring system. The said apparatus may make use of physical monitoring means associated with said apparatus for providing information about the skin temperature and blood pressure and other characteristics of the human body.

It is a further object of the present invention to provide a programmable communications apparatus, which has application to smart clothes such that it provides a secondary communications means for emergency service personnel.

It is a further object of the present invention to provide a programmable communications apparatus, which is suitable for attachment to a life vest. A further object of this application includes a water-enabled communications apparatus, which may be used to communicate with a portable central communications unit.

It is a further object of the present invention to provide a programmable communications apparatus, which comprises a GPS signal processing circuit and the means to respond to an authenticated request to determine its own position and send data relating to its position to

the linked fixed or mobile telephone or to a location determination centre or to a specified web page.

It is a further object of the present invention to provide a programmable communications apparatus, which may be securely attached to a device such as a bicycle, which may be used for communication and for determining the position of the bicycle.

It is a further object of the present invention to provide a programmable communications apparatus, which is suitable for young children such that it comprises an auto-answer facility to connect the caller immediately with an associated microphone and loudspeaker to avoid the need that the child must press a button to answer the call. This application also includes the feature, which returns the programmable communicator automatically to idle state as soon as the caller to the child terminates the call remotely. This avoids the need that the child must terminate the call. It also prevents the child from terminating the call by accident.

It is a further object of the present invention to provide a programmable communications apparatus, which can be used with mobile location based services such that it is possible for an authenticated person to access a web page, either on a hand-held terminal or fixed device, which shows the position of the programmable communications apparatus as an icon on a map after its position has been determined by its own GPS signal processing circuitry or remotely by the network.

Other objects and advantages of this invention will become apparent from the description to follow when read in conjunction with the accompanying drawings.

### **Summary of the Invention**

Certain of the foregoing and related objects are readily-attained according to the present invention by the provision of a novel portable programmable communicator, which serves to address the diverse communication requirements of children and elderly persons and for the purposes of remote data monitoring applications such as for monitoring the status of remote technical devices.

The programmable communicator preferably comprises a basic mobile telephone circuit having no keypad or display and a rechargeable battery and antenna and a basic two-way microphone device and remotely pre-programmable identity module linking it to a single mobile or fixed telephone. Where appropriate, in alternative embodiments, the programmable communicator comprises an alarm means to indicate certain conditions of the communicator such as the charge level of its battery or if the battery is removed. Similar alarm messages are generated according to the particular embodiment of the programmable communicator application which include the generation of messages when an associated wrist strap or attachment of the communicator in the case of a smart clothes application is undone or displaced or when the communicator is switched on or off or when the communicator is set to monitor the status condition of an associated device and the status changes beyond a preset threshold level. The invention also includes the generation of periodic messages to indicate that the communicator is working and that any associated status condition thresholds remain unchanged. This last set of messages, which includes periodic reassurances messages includes the facility that the user may set the duration of the period according to the application.

The programmable communicator has direct and effective application to home networks for the purpose of transmitting information about the status condition of domestic appliances such as the pressure of water pipes and whether a door or window is opened or closed. The wireless programmable communicator can be attached to an associated monitoring device and programmed with the number of a mobile or fixed telephone to which it is to be linked or to an Internet web page which can be made accessible to authenticated users or to security monitoring personnel.

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings, which disclose one embodiment of the invention. It is to be understood, however, that the drawings are designed for the purpose of illustration only and that the particular description of the portable hot link communicating apparatus is given by way of example only and does not

limit the scope of the invention.

### **Brief Description of the Drawings**

The foregoing features of the invention will be more readily understood by reference to the following detailed description, taken with reference to the accompanying drawings, in which:

FIG. 1 illustrates the schematic of the programmable communicator according to one embodiment of the invention.

FIG. 2 illustrates a schema showing the actions performed by the programmable communicator in response to an incoming call or message according to the present invention.

FIG. 3 illustrates a schema showing actions done by the programmable communicator and the outgoing calls or messages, which are generated as a consequence of said actions.

### **Description of a Preferred Embodiment**

Referring now in detail to the drawings and in particular FIG. 1 thereof, therein illustrated is a programmable communicating apparatus according to one embodiment of the present invention.

The following description makes reference to the detailed features as outlined in the objects of the invention.

In FIG. 1 is shown a telephone circuit 10, which comprises an antenna 20 and a battery 30. To the telephone circuit, which may similarly comprise a communicating PDA device circuit, is shown an optional BlueTooth module 40 for communication with a nearby data communication or programming device having a similar BlueTooth radio module. The telephone circuit 10 has a ringing tone generator and an auto answer module 50 which may

be used to cause the programmable communicator to generate one of a number of ringing tones or to auto answer upon receipt of an authenticated permitted caller.

For the purposes of programming the IP address or telephone number of the fixed or mobile telephone to which the communicator is linked is provided an SMS processing means 60. This communicates with an authentication means 90, which in turn is able to store numbers into a permitted callers list 110. For the purposes of security, a sound byte capture means and threshold detector means 100 is provided to generate an alarm message or to send a sound byte to one of the numbers on the permitted callers list. Additional voice recognition software may be used to convert the sound byte into text and send this to the destination telephone number or IP address.

An SMS alarm generation means 70 is provided to work together with a battery charge monitor 35 and a sensor means 80 and an alarm message list 120 and a programmable interface means 140 to generate alarm messages in response to changes in status conditions. Said programmable interface means may be attached to all manner of sensor devices for the purpose of relaying data from external devices and sensors either automatically or in response to a request for information from a remote device.

The periodic status report means 130 may be programmed to provide data on the current status of the programmable communicator as well as data from one or more devices, which may be connected to the communicator via the BlueTooth module 40.

In the case that the programmable communicator is unable to make an immediate connection with the linked telephone or IP address, a reselection means 150 provides one or more connection numbers from the permitted callers list.

This device comprises a novel combination of existing technologies and features, which make possible the existence of a new and improved communicating apparatus to address the communication needs of children and elderly persons and for programmable data tags for monitoring the status of associated technical equipment.



The use of the programmable communicator involves two phases, a pre-programming phase and an active phase. In the pre-programming phase, the communicator is programmed with the number it can call which comprises a unique code. By way of example only, the invention is now described in the context of the GSM mobile telecommunications standard using the Short Message Service or SMS circuit-switched data call. The invention relates to all telephone standards including, and not limited to CDMA and US-TDMA, and is effectively used also in a packet switching mode such as the GSM GPRS packet switching mode. Furthermore the invention is suitably applicable to IP devices, which comprise IP addresses rather than telephone numbers.

According to the invention, it is wished to allow only authenticated callers to change the telephone number or IP address of a fixed or mobile telephone or network device to which the programmable communicator is to be linked. This may be done in GSM using an SMS message, which includes data as well as a unique code such as the unique code of the Subscriber Identity Module or SIM card, often referred to as the PUK code. The PUK code is a unique identifier, which is different for every SIM card. The choice of the PUK is made by way of example only and any similar unique coding may be used for the purpose of the invention

It is a straightforward procedure to communicate with the programmable communicator by SMS. The remote transmitting device includes the PUK code of the receiving programmable communicator in its SMS transmission as well as a telephone number to which the programmable communicator is to be linked.

The programmable communicator includes a processing means to determine that the PUK code is correct and the means to store the transmitted number. The PUK code may also be used to program the list of permitted callers. An SMS comprising the PUK code may contain a plurality of telephone numbers each of which designates a permitted caller's number. Only numbers, which are stored as designated permitted callers, will cause the programmable communicator to generate a ringing tone.

Alternatively, the programmable communicator may include circuitry to terminate the calls of non-permitted callers automatically. In the same way that the telephone number of an incoming call can be shown on the screen of a mobile phone before the phone is answered, this information may be used to enable the programmable communicator to receive the call or to reject it.

Additional codes may be used by authenticated callers to interrogate the status condition of the programmable communicator, or to interrogate the status of data monitoring devices to which the communicator is wired or wirelessly attached.

In this way, in the application for an improved child communicator, only persons knowing the secret PUK code would be able to change the calling number. This provides the essential security for the parents. Furthermore, the feature, which causes the communicator to reject all calls but those from telephone numbers on the permitted callers list serves to shield the child from unwelcome contact.

The following example demonstrates how five SMS messages might program the permitted callers list A-E

SMS 1. PUK code A:040 111 1111

SMS 2. PUK code B:040 222 2222

SMS 3. PUK code C:040 333 3333

SMS 4. PUK code D:040 444 4444

SMS 5. PUK code E:040 555 5555

The letters A to E in the five messages or any equivalent coding may be used to designate the priority of the telephone numbers of the permitted callers such that letter A designates the number to which the programmable communicator is linked at this moment.

In a simple use scenario, a child may be playing in the garden or near to the house wearing a programmable communicator programmed to the mother's telephone phone number, 040 111 1111. In the next moment, the father comes home and sends an SMS to the child's programmable communicator using his phone having telephone number 040 222 2222. In this example, the message comprises PUK code A:040 222 2222 which cause the calling number of the programmable communicator to be now reprogrammed to call the father's number if its call button is pressed by the child.

An additional security feature comprises software, which will cause an SMS emergency message to be sent automatically to the pre-programmed number if the wrist strap is broken or undone, or the communicator is switched off. An additional sensor may be used instead of a means to generate an SMS message if the wrist strap is broken or undone whereby said sensor can sense the heat of the skin, which will cause an SMS message to be sent if the communicator is moved away from the skin.

Additional software features may generate messages to indicate the charge of the battery or if the battery drains completely or is removed.

To avoid a total failure condition, the programmable communicator may comprise a separate back-up power supply in addition to the battery, which is sufficient to generate an alarm message or number of alarm messages, in the instance that a power connection is lost from an associated device or if its own battery supply drains completely.

In this way, the telephone number to which the programmable communicator is linked receives messages about the status of the battery and an indication of whether the communicator has been removed from the child.

In a separate embodiment, is included the feature that certain alarm messages are sent to one or more of the telephone numbers, or IP addresses in the IP network application of this invention, which are on the permitted callers list. This feature would enable at least one other person to receive an alarm message in case the primary linked telephone is busy or the

associated user of the linked telephone is unable to read the message immediately.

The programmable communicator comprises a processing module, which can receive information about its wrist strap or associated attachment. In the embodiment of a smart clothes tag, the said associated attachment may comprise a fibre or wire, which, if mechanically pulled, causes the generation of an alarm message. Clearly, in the case of a wrist worn communicator, the opening or closing of the wrist strap may be used to activate an electronic circuit to generate a status condition of the wrist strap. It is anticipated that the receiver of the alarm message may then call the child directly, if possible, to check if there is a problem. Additionally, location based services may be used to locate the position of the communicator relative to the network infrastructure.

In a separate embodiment, the programmable communicator comprises a feature, which enables a user to cause it to transmit a status message periodically, according to a periodic duration as set by the user, which will provide reassurance that the communicator is functioning correctly, and for example, that the wrist strap is closed, and that the battery has sufficient power.

The types of data that the communicator can provide periodically, or on request, are determined directly by the application of the invention according to different remote monitoring embodiments. In each application the programmable communicator has the appropriate means to receive the data from the monitoring device and the means to process the data.

The programmable communicator has further direct application to the field of remote data monitoring such as in the home network environment. Today, domestic appliances such as washing machines and sauna heaters remain separate from one another and only a few have the capability to be integrated into remote monitoring applications.

The programmable communicator may be used to generate data messages, which describe the status or change in status beyond a threshold condition, of a household appliance and

communicate this data directly to a linked telephone number or IP address of a linked device or Internet web page.

The use of GSM GPRS packet switching technology in this context is ideal since the application does not require a continuous circuit switched connection to the network. The remote monitoring application comprises the use of a programmable communicator, which reacts to a status condition and then initiates a packet data transmission to the network. Consequently, the programmable communicator comprises a separate back-up power supply in addition to the battery, which is sufficient to generate an alarm message or number of alarm messages, in the instance that a power connection is lost from an associated device or if its own battery supply drains completely.

In a separate home-network application, the programmable communicator may be used to gather data from a number of associated monitoring devices and to communicate this to the linked telephone or IP device or Internet web page. The monitoring devices may be directly linked to the programmable communicator by wire or wirelessly connected by, for example, the BlueTooth radio technology in which case the programmable communicator comprises the necessary additional BlueTooth communications module.

In a sports or safety application, the programmable communicator may comprise a smart clothes tag and be sewn into the lining of a life vest such that a person paddling a canoe may use it for urgent communication.

Other applications for the programmable communicator include theme parks and other sports events or places where children may become lost in the crowds.

In addition, the invention may be utilised as a voice and data communicator for bicycles. In this application, data from the bicycle such as speed could be used in sports training as a means to enhance the performance of a cyclist. In a more general application, a programmable communicator can be used to inform the owner of a bicycle that his parked bicycle is being moved and to determine its location, if needed, by making use of the

location-based services functionality of the telecommunications network.

While only one embodiment of the present invention: the programmable communicator within the context of the digital GSM telephone system in particular, has been shown and described in detail, it will be obvious to those persons of ordinary skill in the art, that many changes and modifications may be made thereunto without departing from the spirit of the invention. For example, the hot link communicator may make use of any telephone technology such as CDMA, and US-TDMA. Moreover, the inventive features of the programmable communicator may be incorporated into a monitoring device and integrated with it such that the device comprises the capability of the programmable communicator. The invention is not limited to the application of the programmable communicator as a separate device, which separately communicates with data monitoring devices but also includes the application of the functionality of the invention as an integrated part of the monitoring device.

It is further to be understood that the invention may make use of all coding schemes for storing numbers to the programmable apparatus and the use of the PUK code was by way of example only. The programmable communicator may comprise the means to accept all manner of clip on covers so that the same base model may carry one of a number of different covers to suit the tastes and the age groups of different wearers.

What is claimed is:

1. A programmable communicator device, the device comprising:

a wireless communications circuit, including an antenna, configured to receive a transmission;

an identity module having a unique identifier;

a processing module including program code configured to determine if the transmission is from an authenticated caller by determining whether a received transmission contains the unique identifier; and

memory configured to store telephone numbers or IP addresses received in transmissions from an authenticated caller.

2. The programmable communicator device according to Claim 1, wherein the processing module is further configured to terminate calls from numbers or IP addresses not stored in memory.

3. The programmable communicator device according to Claim 2, wherein the wireless communication circuit further comprises an auto answer module configured to automatically answer incoming calls.

4. The programmable communicator device according to Claim 2, wherein the wireless communication circuit further comprises a ringing tone generator.

5. The programmable communicator device according to Claim 4, wherein the processing module is further configured to allow the ringing tone generator to ring for incoming calls from numbers or IP addresses stored in memory.

6. The programmable communicator device according to Claim 1, further comprising an associated monitoring device linked to the programmable communicator device to permit relaying of data from the linked monitoring device to one or more of the telephone numbers or IP addresses stored in the memory.

7. The programmable communicator device according to Claim 6, further comprising a locating system configured to monitor the location of the monitoring device and store the location information in the memory.

8. The programmable communicator device according to Claim 6, further comprising a sensor configured to monitor a condition of the monitoring device and prompt the programmable communicator to repeatedly call at least one of the stored telephone numbers or IP addresses when a threshold is reached.

9. The programmable communicator device according to Claim 6, the programmable communicator device further comprising a sensor configured to monitor a condition of the monitoring device, prompt the programmable communicator device with a digital signal when a threshold is reached, store the digital signal in memory, and send the digital signal in the form of a data message to at least one of the stored IP addresses.

10. The programmable communicator device according to Claim 6, wherein  
the wireless communication circuit is further configured to receive at least one digital command; and  
the monitoring device is further configured to read the at least one digital command, execute a task in response to said digital command, measure physical or process status data, and store measured data into the memory.

11. A method of programming a programmable communicator device, the method comprising:  
receiving a transmission in the programmable communicator device;  
authenticating a caller by determining if the received transmission contains a unique identifier;  
storing telephone numbers or IP addresses received in the transmissions from an authenticated caller into memory.



12. The method of programming a programmable communicator device according to Claim 11, the method further comprising terminating a call from a number or IP address not stored in memory.

13. The method of programming a programmable communicator device according to Claim 12, the method further comprising automatically answering incoming calls.

14. The method of programming a programmable communicator device according to Claim 12, the method further comprising generating a ringing tone for incoming calls from numbers or IP addresses stored in memory.

15. The method of programming a programmable communicator device according to Claim 11, the method further comprising relaying data from a linked monitoring device to one or more of the telephone numbers or IP addresses stored in memory.

16. The method of programming a programmable communicator device according to Claim 15, the method further comprising:  
    monitoring the location of the monitoring device; and  
    storing the monitored location information in memory.

17. The method of programming a programmable communicator device according to Claim 15, the method further comprising:  
    monitoring a condition of the monitoring device;  
    prompting the programmable device to repeatedly call at least one of the stored telephone numbers when a threshold is reached; and  
    repeatedly calling the at least one of the stored telephone numbers when a threshold is reached.

18. The method of programming a programmable communicator device according to Claim 15, the method further comprising:  
    monitoring a condition of the monitoring device;

prompting the programmable device with a digital signal when a threshold is reached;  
storing the digital signal in memory; and  
sending the digital signal in the form of a data message to at least one of the stored IP  
addresses.

19. The method of programming a programmable communicator device according to Claim  
15, the method further comprising:

receiving at least one digital command;  
reading the at least one digital command;  
initiating the monitoring device to execute a task in response to the at least one digital  
command;  
measuring physical or process status information; and  
storing the measured data into memory.

20. The method of programming a programmable communicator device according to Claim  
19, the method further comprising:

analyzing the measured data; and  
reprogramming the programmable communicator in order to re-initiate the  
monitoring device based on the data analysis.

Attorney Docket: [01503/00105]

**[Programmable Communicator]**

**Abstract**

A programmable communicator device is disclosed having a wireless communications circuit, including an antenna, configured to receive a transmission, and an identity module having a unique identifier. The programmable communicator further includes a processing module including program code configured to determine if the transmission is from an authenticated caller by determining whether a received transmission contains the unique identifier, and memory configured to store telephone numbers or IP addresses received in transmissions from an authenticated caller.

1/3

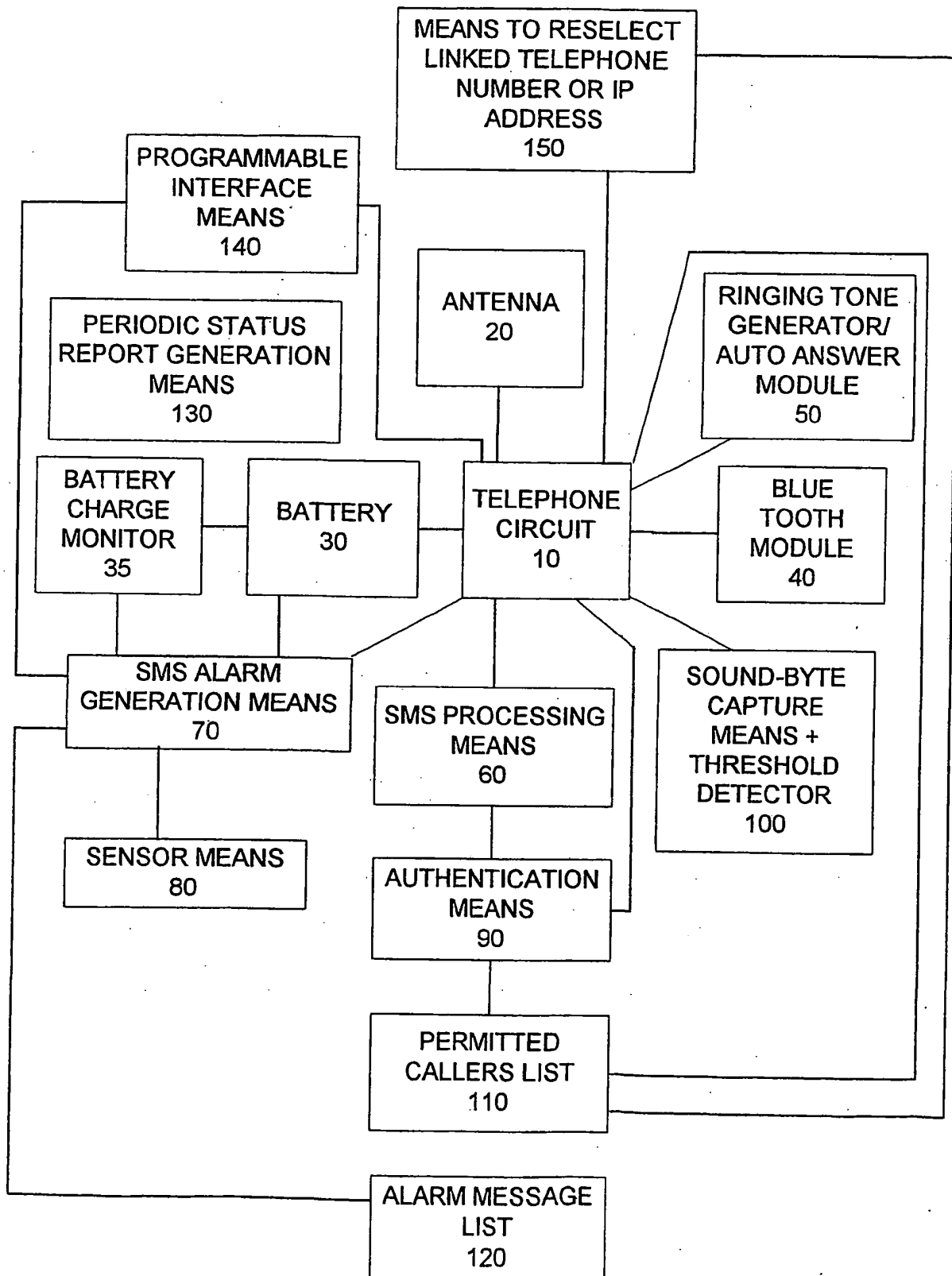


FIGURE-1

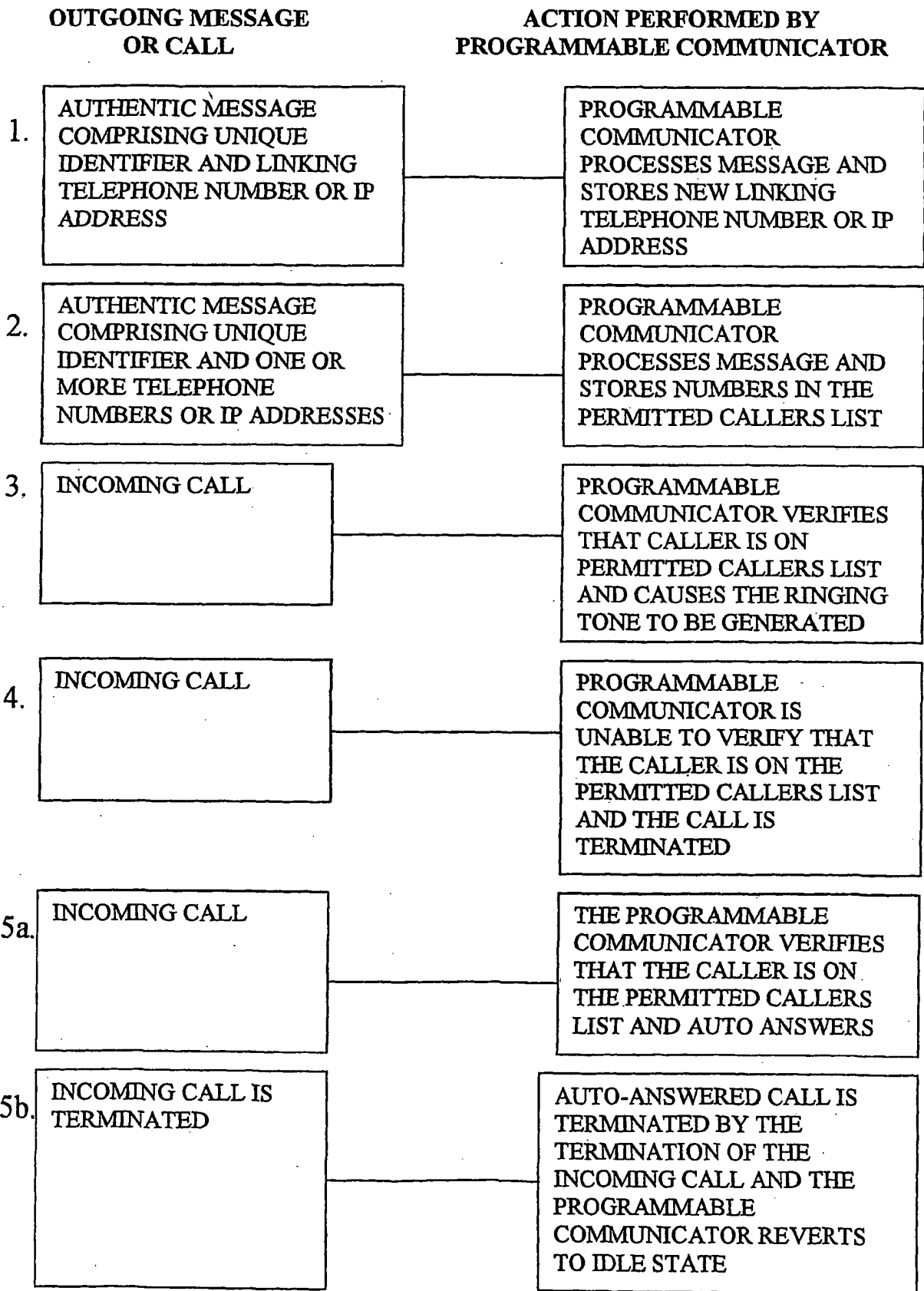


FIGURE 2.

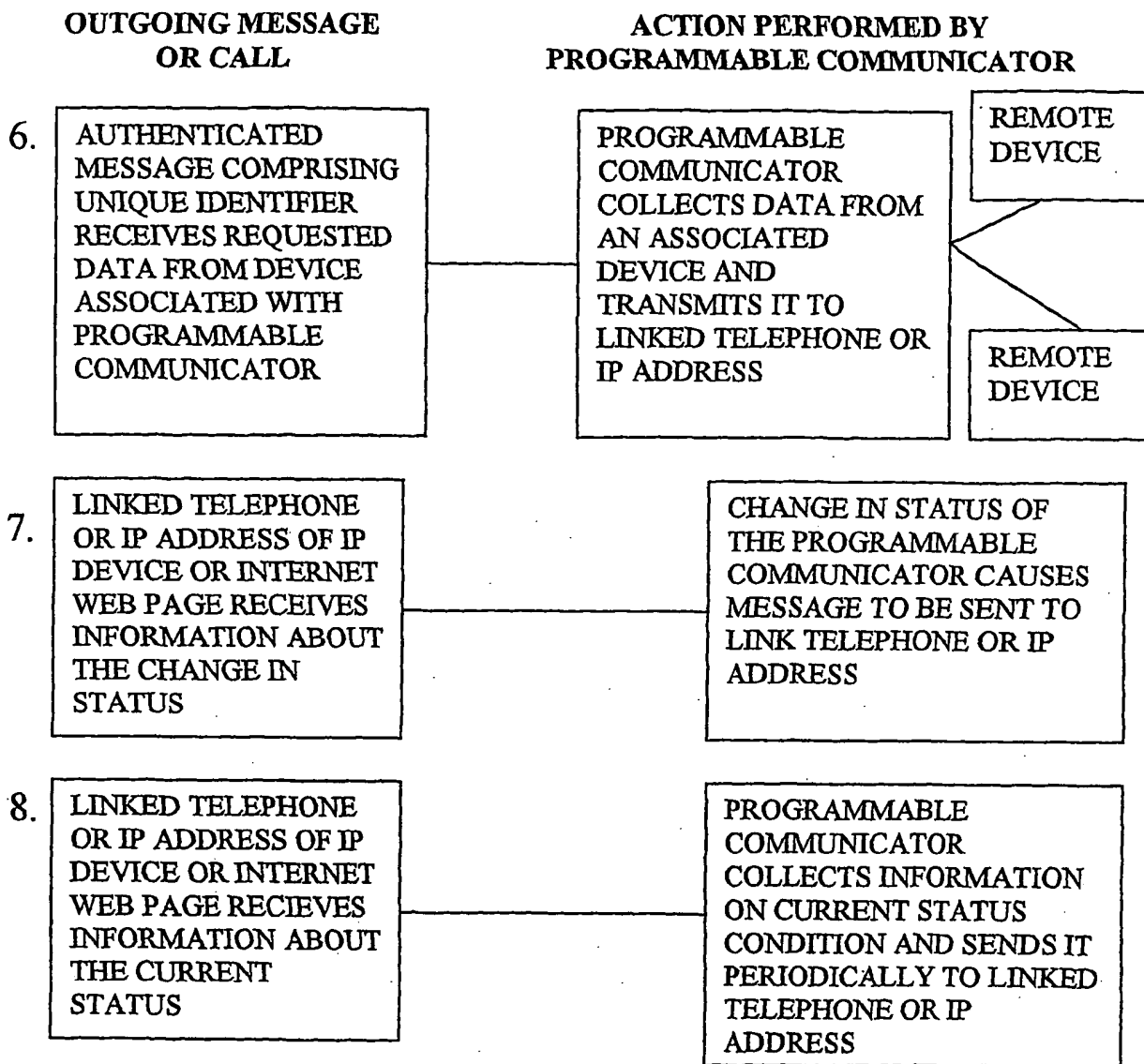


FIGURE 3

ATTORNEY'S DOCKET NO.: PA2652US

**DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

**"Programmable Communicator"**

the specification of which:

is attached hereto.  
 was filed on November 22, 2002 as a U.S. National Phase Application with U.S. Application No. pending of PCT International Application No. PCT/EP01/05738 and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

**POWER OF ATTORNEY:** I hereby appoint the attorney(s) and/or agent(s) associated with the customer number **22830** to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first inventor: Eveline Wesby Van Swaay      Citizenship: Dutch

Inventor's signature:       Dated: 12.12.2002

Residence Address: CAMDEN HOUSE, SCHOOL LANE, TIDDINGTON,

STRATFORD UPON AVON, CV37 7AJ,  
Mailing Address: UNITED KINGDOM



**Practitioner's Docket No. 1503/104**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Eveline Wesby-Van Swaay

Application No.: 10/296,571

Group No.: 2635

Filed: 01/21/03

Examiner: Nguyen, Nam V.

For: Programmable Communicator

**Commissioner for Patents**

**P.O. Box 1450**

**Alexandria, VA 22313-1450**

**POWER OF ATTORNEY BY ASSIGNEE OF ENTIRE INTEREST  
(REVOCAION OF PRIOR POWERS)**

As assignee of record of the entire interest of the above identified application,

**REVOCAION OF PRIOR POWERS OF ATTORNEY**

all powers of attorney previously given are hereby revoked and

**NEW POWER OF ATTORNEY**

the following practitioners are hereby appointed to prosecute and transact all business in the Patent and Trademark Office connected therewith.

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Robert M. Asher, Registration No. 30,445  
Timothy M. Murphy, Registration No. 33,198  
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617-443-9292

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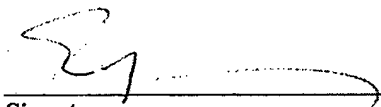
Eveline Wesby-Van Swaay  
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United Kingdom

Recorded herewith

**ASSIGNEE STATEMENT**

Attached to this power is a "STATEMENT UNDER 37 C.F.R. § 3.73(b)."

Date: December 20<sup>th</sup> 2005

  
\_\_\_\_\_  
**Signature**  
Eveline Wesby-van Swaay

**Assignee**

00002/KLW 454659.1

PATENT APPLICATION SERIAL NO \_\_\_\_\_

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE  
FEE RECORD SHEET

.01/12/2006 EAYALEW1 00000038 11329212

01 FC:2011	150.00 OP
02 FC:2111	250.00 OP
03 FC:2311	100.00 OP

PTO-1556  
(5/87)

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number  
11,329,212

**APPLICATION AS FILED - PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	0
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	0
APPLICATION SIZE FEE (37 CFR 1.16(e))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

**SMALL ENTITY**

OR

**OTHER THAN SMALL ENTITY**

RATE (\$)	FEE (\$)
N/A	150.00
N/A	250
N/A	100
X\$ 25 =	
X100 =	
+180=	
TOTAL	500

OR

RATE (\$)	FEE (\$)
N/A	300.00
N/A	500
N/A	200
X\$50 =	
X200 =	
+360=	
TOTAL	

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**APPLICATION AS AMENDED - PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	Minus **	=
	Independent (37 CFR 1.16(h))	Minus ***	=
	Application Size Fee (37 CFR 1.16(s))		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

**SMALL ENTITY**

OR

**OTHER THAN SMALL ENTITY**

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25 =	
X100 =	
+180=	
TOTAL ADD'L FEE	

OR

RATE (\$)	ADDITIONAL FEE (\$)
X\$50 =	
X200 =	
+360=	
TOTAL ADD'L FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	Minus **	=
	Independent (37 CFR 1.16(h))	Minus ***	=
	Application Size Fee (37 CFR 1.16(s))		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			

**SMALL ENTITY**

OR

**OTHER THAN SMALL ENTITY**

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25 =	
X100 =	
+180=	
TOTAL ADD'L FEE	

OR

RATE (\$)	ADDITIONAL FEE (\$)
X\$50 =	
X200 =	
+360=	
TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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### Correspondence Information

Correspondence Customer Number:: 2101

### Application Information

Title Line One:: Programmable Communicator  
Total Drawing Sheets:: 3  
Formal Drawings?:: Yes  
Application Type:: Utility  
Docket Number:: 1503/105

### Representative Information

Representative Registration Number:: 30,445

### Continuity Information

This application is a:: Continuation of  
>Application One:: 10/296,571  
Filing Date:: January 21, 2003

Which is a:: 371 of  
>> Application Two: PCT/EP01/05738  
Filing Date:: May 18, 2001

### Prior Foreign Applications

Foreign Application One:: 20001239  
Filing Date:: 23 May 2000  
Country:: Finland  
Priority Claimed:: Yes

**SECTION 2. FORMS PTO/SB/08A and 08B (formerly Form PTO-1449)**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Eveline Wesby Van Swaay Attorney Docket: 1503/105  
 Serial No: N/A Art Group Unit: N/A  
 Date Filed: Herewith Examiner Name: N/A  
 Invention: Programmable Communicator

**LIST OF PATENTS AND PUBLICATIONS FOR  
 APPLICANT'S INFORMATION DISCLOSURE STATEMENT**

U.S. PATENT DOCUMENTS					
Examiner Initials	Reference Number	Document Number	Issue Date	Inventor	Class/Subclass
	AA	US 5,276,729	01-04-1994	Higuchi et al	379/58
	AB	US 5,381,138	01-1995	Stair et al	340/7.41
	AC	US 5,581,803	12-1996	Grube et al	340/7.41
	AD	US 5,742,666	04-21-1998	Alpert	379/58
	AE	US 5,774,804	06-1998	Williams, Ian C.	455/419
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	AG	US 5,878,339	03-02-1999	Zicker et al	455/419
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	AL	US 6,424,623	07-2002	Borgstahl et al	370/230

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Examiner Initials	Reference Number	Country Code	Document Number	Publication Date	Patentee or Applicant	Class/Subclass
	AM	DE	197 07 681 C1	05-07-1998	Erbel et al	
	AN	EP	0 996 302 A1	04-26-2000	Alcatel	
	AO	JP	2000 115859	04-21-2000	Ericsson Inc.	
	AP	WO	International Search Report for PCT/EP01/05738		Wesby-Van Swaay	

Examiner Signature: \_\_\_\_\_

Date Considered: \_\_\_\_\_

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation *if not* in conformance and not considered. Include copy of this form with next communication to applicant.

01503/00105 458498.1



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DEUTSCHLAND



DEUTSCHES  
PATENTAMT

12 Patentschrift  
10 DE 197 07 681 C 1

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H 04 M 1/53  
H 04 M 11/04  
H 04 Q 7/14  
G 08 B 25/10  
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// H04Q 7/32

AMI

DE 197 07 681 C 1

Innerhalb von 3 Monaten nach Veröffentlichung der Erteilung kann Einspruch erhoben werden

73 Patentinhaber:  
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Häckel, 45128 Essen

72 Erfinder:  
gleich Patentinhaber

66 Für die Beurteilung der Patentfähigkeit in Betracht  
gezogene Druckschriften:

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GB 22 82 936 A  
US 47 51 726  
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EP 00 97 741 A1

Katalog "Electronic Welt '96" Conrad Electronic,  
92240 Hirschau, Aug.95, S.456 u. 490;

54 Mobiltelefon

57 Die Erfindung betrifft ein Mobiltelefon, mit einem Gehäuse (1), einem Sender, mindestens einem Empfänger, einem Rufnummernspeicher und mit am Gehäuse (1) angeordneten Tasten (2).  
Erfindungsgemäß ist ein derartiges bekanntes Mobiltelefon dadurch ausgestaltet und weitergebildet, daß am Gehäuse (1) mindestens eine, bei Betätigung die Wahl einer im Rufnummernspeicher gespeicherten Notrufnummer veranlassende in Größe und/oder Farbe hervorgehobene Notruftaste (5) angeordnet ist.

DE 197 07 681 C 1



## Beschreibung

Die Erfindung betrifft ein Mobiltelefon mit einem Gehäuse, einem Sender, mindestens einem Empfänger, einem Rufnummernspeicher und mit am Gehäuse angeordneten Tasten, wobei am Gehäuse mindestens eine, bei Betätigung die Wahl einer im Rufnummernspeicher gespeicherten Notrufnummer veranlassende in Größe und/oder Farbe hervorgehobene Notruftaste angeordnet ist.

Ein Mobiltelefon der eingangs genannten Art ist bereits aus der EP 0 679 041 A2 bekannt. Bei dem bekannten Mobiltelefon wird nach dem Betätigen der Notruftaste selbstständig über ein an sich bekanntes Mobilfunksystem eine Verbindung zu einer Zentralstelle hergestellt. In einem Speicher des Mobiltelefons gespeicherter Text wird nach dem Herstellen der Verbindung zur Zentralstelle übertragen. Die Zentralstelle übermittelt selbstständig die Position des Mobiltelefons entweder durch Ortung mittels der Basisstationen des Mobilfunksystems oder mittels der von dem Mobiltelefon empfangener Positionsdaten, wenn letzteres mit einer eigenen Ortungseinheit versehen ist. Durch das bekannte Mobiltelefon ist es zwar möglich, den jeweiligen Patienten zu orten. Dies reicht jedoch bei Patienten mit Herz-Kreislauf-Erkrankungen regelmäßig nicht aus. Hier sind regelmäßig sofortige Hilfsmaßnahmen erforderlich.

Erkrankungen des Herz-Kreislauf-Systems stehen an der Spitze des gesamten Krankheitsgeschehens in Deutschland. Die koronare Herzerkrankung ist in den westlichen Industrienationen die häufigste Todesursache. In Deutschland sind beispielsweise etwa 300 000 Menschen jährlich von einem Herzinfarkt betroffen. Bei einem solchen Herzinfarkt sind die häufigsten Komplikationen mit meist tödlichem Ausgang Rhythmusstörung und Herzinsuffizienz. Dabei erleiden in Deutschland 60 000 Menschen jährlich einen plötzlichen Herztod. Dieser Herztod ist gekennzeichnet durch einen plötzlichen Herzstillstand, der ohne sofortige Maßnahmen der kardiopulmonalen Reanimation oder Wiederbelebung regelmäßig tödlich endet. Ursachen für den plötzlichen Herztod sind zu 80–90% das sogenannte Kammerflattern oder Kammerflimmern (tachykarde Herzrhythmusstörungen), zu 10–15% ein akuter Myokardinfarkt und zu 5% bradykarde Rhythmusstörungen. Die Überlebensrate der Patienten, die einen plötzlichen Herztod erleiden, liegt zwischen 5 und 20%. Für die Höhe der Überlebensrate ist ganz entscheidend maßgeblich, wie schnell geeignete Hilfsmaßnahmen ergriffen werden können.

Eine Vielzahl der Personen, die ein hohes Herzinfarktrisiko haben, sind sich nach entsprechenden Untersuchungen ihres Risikos bewußt und sind bestrebt, dieses Risiko zu minimieren, indem sie sich möglichst nicht in Situationen begeben, in denen die Ergreifung sofortiger Hilfsmaßnahmen nicht möglich ist. So vermeiden es die betroffenen Personen beispielsweise, sich ohne Begleitpersonen an Orte zu begeben, an denen die Wahrscheinlichkeit im Falle eines Herzinfarktes sofort aufgefunden zu werden gering ist, da sie in diesen Fällen damit rechnen müssen, daß ihre Überlebenschancen beim Eintritt eines plötzlichen Herztodes nahezu gleich null sind.

Aus der EP 0 097 741 ist bereits eine bioelektrische Einheit für Patienten mit Herz-Kreislauf-Erkrankungen bekannt. Die Einheit hat die Form eines Telefonhörers eines stationären Telefongeräts. Im Bereich der Ohr- und der Sprechmuschel befinden sich jeweils Aufnahmeelektroden für bioelektrische Signale, die in Audiosignale über einen Umwandler umgewandelt werden. Die bekannte Einheit kann ohne weiteres dazu verwendet werden, Herzsignale zu einer Aufnahmestation zur Analyse zu senden und dann entsprechende Instruktionen und Anweisungen von der Auf-

nahmestation empfangen, um die geeigneten Hilfsmaßnahmen einzuleiten.

Aufgabe der vorliegenden Erfindung ist es, ein Mobiltelefon der eingangs genannten Art derart auszugestalten und weiterzubilden, daß bei Patienten mit Herz-Kreislauf-Erkrankungen die Ergreifung sofortiger Hilfsmaßnahmen umgehend möglich ist.

Erfindungsgemäß ist die zuvor genannte Aufgabe dadurch gelöst, daß mindestens zwei – vorzugsweise vier – mit dem Gehäuse verbundene, die Aufnahme von Elektrokardiogramm- (EKG) Signalen ermöglichende Elektroden vorgesehen sind und ein die EKG-Signale auswertender, sendefähig transformierender und an den Sender übermittelnder EKG-Signalwandler vorgesehen ist. Bei einem derart ausgestalteten Mobiltelefon legt der Patient selbst oder eine Begleitperson die Elektroden auf die entkleidete Brust des Patienten, woraufhin ein EKG abgeleitet wird, das automatisch an die Überwachungszentrale übermittelt wird. Diese Ausgestaltung ermöglicht die Differenzialdiagnose eines akuten Herzinfarktes (ST-Streckenhebung) oder einer zugrundeliegenden Herzrhythmusstörung (Tachykardie, Bradykardie) bzw. eines elektrischen Herzstillstands (Asystolie). Die EKG-Erfassung und Übermittlung ermöglicht die Einschätzung der vitalen Bedrohung des Patienten und die Einleitung entsprechend geeigneter Notfallmaßnahmen. Auf Grundlage des übermittelten EKG ist auch eine Laien-Reanimation durch eine Begleitperson oder eine zufällig in der Nähe befindliche Person über das Mobiltelefon beeinflussbar und steuerbar.

Dabei ist weiterhin bei einer ersten Alternative vorgesehen, daß die EKG-Elektroden auf der den Tasten abgewandten Rückseite des Gehäuses angeordnet sind. In diesem Fall wird ein EKG einfach dadurch aufgenommen, daß das Mobiltelefon mit seiner Rückseite auf die entkleidete Brust des Patienten gelegt wird. Eine entsprechende Handhabung ist hierbei denkbar einfach.

Alternativ zu der Anordnung der EKG-Elektroden auf der Rückseite des Gehäuses ist vorgesehen, daß die EKG-Elektroden auf einem im Ruhezustand mit dem Gehäuse unmittelbar verbundenen und im abgenommenen Zustand über ein Kabel mit dem Gehäuse verbundenen Träger angeordnet sind. Bei einer derartigen Ausgestaltung ist das Anlegen des Trägers an die entkleidete Brust des Patienten aufgrund einer vorzugsweise entsprechend angepaßten Form nochmals optimiert und es wird gleichzeitig die Möglichkeit gegeben, ein EKG beispielsweise auch während einer Laien-Reanimation aufzunehmen, wobei gleichzeitig eine Begleitperson in Sprechverbindung mit der Überwachungszentrale zur Steuerung der Laien-Reanimation steht.

Eine erste vorteilhafte Ausgestaltung erfährt die Erfindung dadurch, daß eine die Übermittlung von eine Identifikation ermöglichenden Daten bei der Betätigung der Notruftaste bewirkende Identifikationseinrichtung vorgesehen ist. Durch eine solche Identifikation ist gewährleistet, daß die Überwachungszentrale sofort über die beispielsweise in einem EDV-System gespeicherten Patientendaten auch für den Fall, daß der Patient bewußtlos ist, gezielte Notfallmaßnahmen einleiten kann. Mit der genannten Maßnahme ist beispielsweise auch eine Patientenidentifikation möglich, wenn der bewußtlose Patient von einer unbeteiligten Person aufgefunden und der Notruf von dieser Person abgesetzt worden ist. Eine solche Identifikation ist beispielsweise über die Rufnummer des Mobiltelefons möglich, die bei einigen Mobilfunknetzen bei der Herstellung einer Verbindung standardmäßig übertragen wird.

Ist weiter eine die Freigabe von Positionsdaten bei der Betätigung der Notruftaste bewirkende Freigabeeinrichtung vorgesehen, so ist gewährleistet, daß die Position des Patienten

ten auch für den Fall festgestellt werden kann, in dem der Patient lediglich sozusagen mit letzter Kraft die Notruftaste betätigt hat. Eine derartige Ausgestaltung ermöglicht es auch in einer solchen Situation den Patienten aufzufinden und Soforthilfemaßnahmen einzuleiten. Einige Mobilfunknetze ermöglichen technisch eine solche Positionsbestimmung allein aufgrund der Tatsache, daß diese Mobilfunknetze in sogenannte Zellen aufgeteilt sind, und festgestellt werden kann, aus welcher Zelle des Mobilfunknetzes der Notruf getätigt wurde. In diesem Fall bedarf es keiner gesonderten Einrichtung zur Positionsbestimmung.

Eine sehr genaue Positionsbestimmung wird dadurch ermöglicht, daß ein externe Positionssignale empfangender und auswertender Positionsempfänger und ein die Signale des Positionsempfängers sendefähig transformierender und an den Sender übermittelnder Positionssignalwandler vorgesehen ist. Mit Hilfe eines solchen Positionsempfängers ist es beispielsweise möglich, aufgrund der Signale des Global-Positioning-Systems (GPS) die Position des Patienten auf wenige Meter genau zu bestimmen. Diese Signale werden dann über den Positionssignalwandler dem Sender zugeführt, der sie wiederum an die Überwachungszentrale übermittelt, so daß entsprechend in der Überwachungszentrale hochpräzise Angaben über die Position des Patienten vorliegen.

Schließlich erfährt das erfindungsgemäße Mobiltelefon eine weitere vorteilhafte Ausgestaltung dadurch, daß ein das Verlassen des Empfangs-/Sende-Bereiches des Mobilfunknetzes detektierender und die Ausgabe eines Warnsignals veranlassender Empfangsstärkensenor vorgesehen ist. Hierdurch ist gewährleistet, daß der Patient stets darüber informiert ist, ob im Augenblick tatsächlich eine Verbindung zur Überwachungszentrale im Falle eines Notrufes möglich ist.

Im einzelnen gibt es also verschiedene Möglichkeiten, das erfindungsgemäße Mobiltelefon auszugestalten und weiterzubilden. Dazu wird verwiesen einerseits auf die dem Patentanspruch 1 nachgeordneten Patentansprüche, andererseits auf die Beschreibung eines bevorzugten Ausführungsbeispiels in Verbindung mit der Zeichnung. In der Zeichnung zeigt

Fig. 1 ein Ausführungsbeispiel eines erfindungsgemäßen Mobiltelefons in einer Frontansicht und

Fig. 2 das Ausführungsbeispiel eines erfindungsgemäßen Mobiltelefons in einer Rückansicht.

Das in Fig. 1 in einer Frontansicht dargestellte Ausführungsbeispiel eines erfindungsgemäßen Mobiltelefons weist auf ein Gehäuse 1, nicht dargestellt und im Gehäuse angeordnet einen Sender, mindestens einen Empfänger und einen Rufnummernspeicher und am Gehäuse 1 angeordnete Tasten 2. Darüber hinaus weist das Mobiltelefon ein LCD-Display 3 und eine Antenne 4 auf. Erfindungsgemäß ist am Gehäuse 1 eine, bei Betätigung die Wahl einer im Rufnummernspeicher gespeicherten Notrufnummer veranlassende, in Größe und Farbe hervorgehobene Notruftaste 5 angeordnet. In dem dargestellten Ausführungsbeispiel ist die Notruftaste 5 deutlich größer als die üblichen Tasten 2. Zur weiteren Kenntlichmachung ihrer Funktion ist die Notruftaste 5 herzförmig ausgestaltet und im Ausführungsbeispiel rot abgesetzt hervorgehoben.

Die gemäß verschiedenen Ausgestaltungen des erfindungsgemäßen Mobiltelefons vorgesehenen Identifikations- und Freigabe-Einrichtungen, Positionsempfänger, Positionssignalwandler, EKG-Signalwandler und Empfangsstärkensenor sind als elektronische Baueinheiten ausgeführt und, in der Zeichnung nicht dargestellt, im Gehäuse 1 angeordnet.

In Fig. 2 der Zeichnung ist schließlich das Ausführungs-

beispiel eines erfindungsgemäßen Mobiltelefons in einer Rückansicht dargestellt. In der Rückansicht ist deutlich zu erkennen, daß auf der den Tasten abgewandten Rückseite des Gehäuses 1 vier EKG-Elektroden 6, 7, 8, 9 angeordnet sind, die es bei dem mit der Rückseite auf die entkleidete Brust eines Patienten gelegten Mobiltelefon ermöglichen, ein EKG abzuleiten.

Weitere denkbare Ausgestaltungen des erfindungsgemäßen Mobiltelefons sind beispielsweise eine zusätzliche Beschriftung der Notruftaste 5 etwa mit dem Wort "Notruf" und/oder die Anbringung von Befestigungsmöglichkeiten am Gehäuse 1, die über ein Umhängeband das Tragen des erfindungsgemäßen Mobiltelefons auf der Brust ermöglichen.

#### Patentansprüche

1. Mobiltelefon mit einem Gehäuse (1), einem Sender, mindestens einem Empfänger, einem Rufnummernspeicher und mit am Gehäuse (1) angeordneten Tasten (2), wobei am Gehäuse (1) mindestens eine, bei Betätigung die Wahl einer im Rufnummernspeicher gespeicherten Notrufnummer veranlassende in Größe und/oder Farbe hervorgehobene Notruftaste (5) angeordnet ist, **dadurch gekennzeichnet**, daß mindestens zwei – vorzugsweise vier – mit dem Gehäuse (1) verbundene, die Aufnahme von EKG-Signalen ermöglichende Elektroden (6, 7, 8, 9) vorgesehen sind und ein die EKG-Signale auswertender, sendefähig transformierender und an den Sender übermittelnder EKG-Signalwandler vorgesehen ist, und daß die EKG-Elektroden (6, 7, 8, 9) auf der den Tasten (2) abgewandten Rückseite des Gehäuses (1) angeordnet sind oder daß die EKG-Elektroden (6, 7, 8, 9) auf einem im Ruhezustand mit dem Gehäuse (1) unmittelbar verbundenen, im abgenommenen Zustand über ein Kabel mit dem Gehäuse (1) verbundenen Träger angeordnet sind.
2. Mobiltelefon nach Anspruch 1, dadurch gekennzeichnet, daß eine die Übermittlung von eine Identifikation ermöglichenden Daten bei der Betätigung der Notruftaste (5) bewirkende Identifikationseinrichtung vorgesehen ist.
3. Mobiltelefon nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß eine die Freigabe von Positionsdaten bei der Betätigung der Notruftaste (5) bewirkende Freigabeeinrichtung vorgesehen ist.
4. Mobiltelefon nach Anspruch 3, dadurch gekennzeichnet, daß ein externe Positionssignale empfangender und auswertender Positionsempfänger und ein die Signale des Positionsempfängers sendefähig transformierender und an den Sender übermittelnder Positionssignalwandler vorgesehen ist.
5. Mobiltelefon nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß ein das Verlassen des Empfangs-/Sende-Bereiches des Mobilfunknetzes detektierender und die Ausgabe eines Warnsignals veranlassender Empfangsstärkensenor vorgesehen ist.

Hierzu 1 Seite(n) Zeichnungen

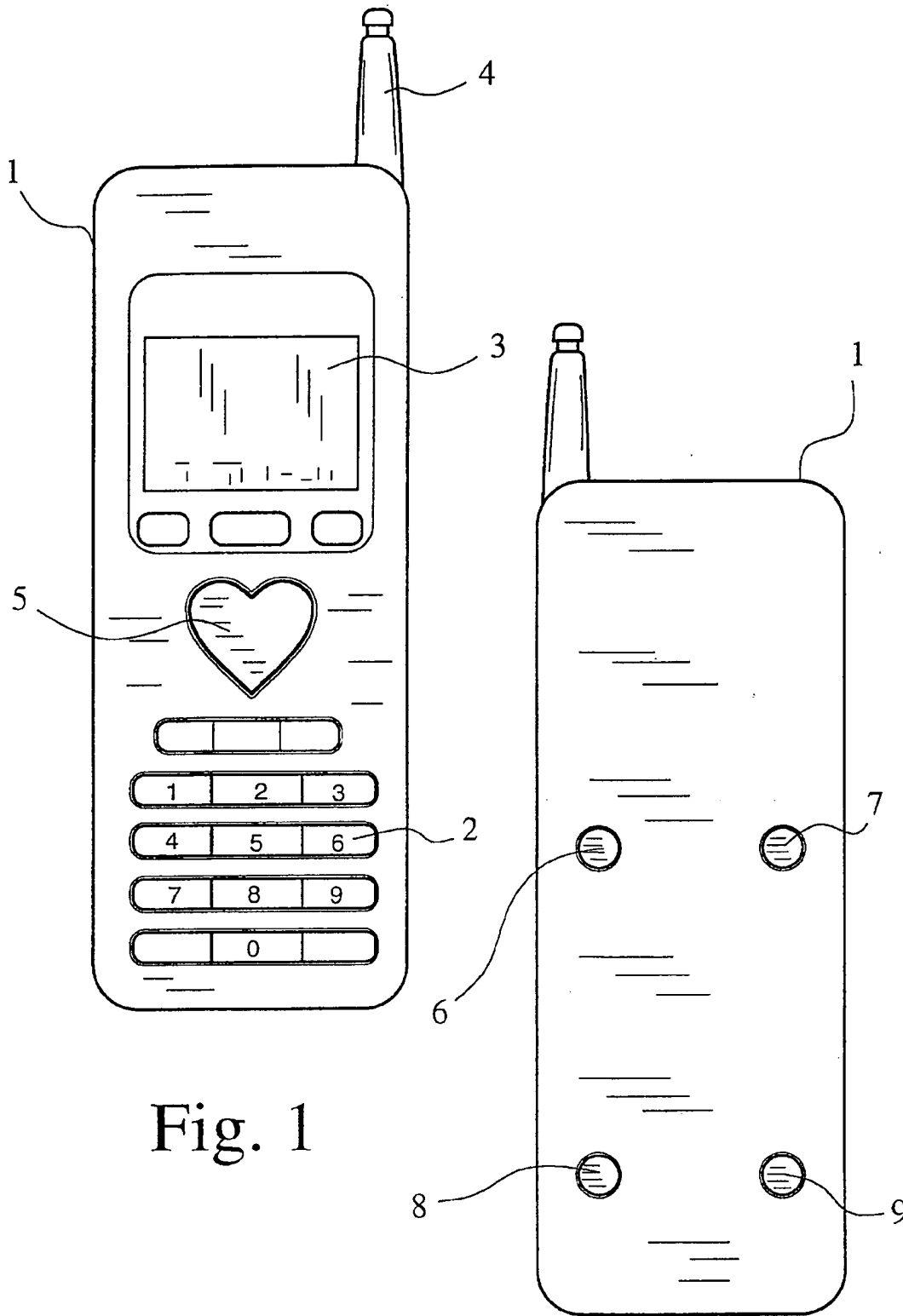


Fig. 1

Fig. 2

AN



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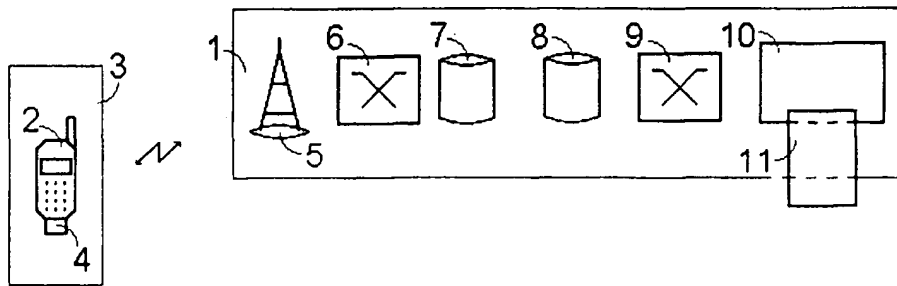
(54) **Procédé de mise à jour à distance du logiciel d'un terminal radiotelephonique**

(57) Procédé pour la mise à jour du logiciel d'un terminal radiotéléphonique (2), de type GSM ou équivalent, par l'intermédiaire d'une station de base (5), radiotéléphonique, auprès duquel le terminal est radiotéléphoniquement localisé, et à partir des données fournies par une plate-forme de programmation (11) intervenant au niveau d'un centre serveur (10) auquel la station de

base est reliée dans le cadre d'un réseau fixe de télécommunications.

Une mise à jour de terminal est réalisée par un échange transparent de messages radiotéléphoniques courts, de type SMS ou équivalent, à l'initiative de la plate-forme de programmation et en coopération avec le centre serveur.

FIG. 1



## Description

[0001] L'invention concerne un procédé destiné à permettre la mise à jour à distance du logiciel d'un terminal radiotéléphonique de réseau cellulaire et plus particulièrement d'un terminal radiotéléphonique mobile de type GSM.

[0002] De tels terminaux téléphoniques sont classiquement fournis à leurs utilisateurs avec une programmation déterminée qui est fonction des besoins de ces utilisateurs et des choix faits tant par eux que pour eux.

[0003] Pour diverses raisons, il faut pouvoir modifier les programmations après livraison des terminaux à leurs utilisateurs, par exemple à des fins d'amélioration du service rendu, de mise à jour d'éléments logiciels soumis à évolution ou de mise en service d'options nouvelles ou nouvellement requises.

[0004] A cet effet, il a été initialement prévu de demander aux utilisateurs d'apporter les terminaux radiotéléphoniques dont ils disposent en un lieu où une mise à jour peut être effectuée, toutefois c'est une solution que l'on s'efforce actuellement d'éviter.

[0005] Une autre solution est fournie dans le document EP-A-478231 qui décrit un procédé pour programmer un terminal radiotéléphonique par des signaux transmis par voie radio, depuis un centre serveur de mise à jour, suite à la mise du terminal dans un mode de programmation par l'utilisateur. Cette solution est notamment utilisée pour permettre à des utilisateurs d'obtenir des codes d'autorisation pour des services de mobile spécifiques. Elle convient bien lorsque la demande de mise à jour est effectuée à la demande de l'utilisateur, mais elle n'est pas satisfaisante lorsque cette demande ne provient pas de lui et doit être réalisée le plus tôt possible.

[0006] Encore une autre solution est présentée dans la demande de brevet EP-A-562890 qui décrit un procédé de mise à jour d'informations contenues dans une carte SIM d'un terminal mobile de type GSM en utilisant les canaux de signalisation, c'est-à-dire la fonction SMS (*Short Message Service*).

[0007] Néanmoins, cette solution présente l'inconvénient majeur de ne pas être sécurisé. Autrement dit, la carte SIM d'un terminal peut être mise à jour, de façon erronée, soit par erreur, soit par malveillance.

[0008] Un procédé sécurisé permettant une mise à jour d'un terminal, sans qu'il soit nécessaire de faire intervenir l'utilisateur et sans qu'il soit nécessaire que soit établie une connexion d'appel, serait avantageux.

[0009] L'invention propose donc un procédé pour la mise à jour du logiciel d'un terminal radiotéléphonique, de type GSM ou équivalent, par l'intermédiaire d'une station de base, radiotéléphonique, auprès duquel le terminal est radiotéléphoniquement localisé, et à partir d'une plate-forme de programmation intervenant au niveau d'un centre serveur auquel la station de base est reliée dans le cadre d'un réseau fixe de télécommunications.

[0010] Selon une caractéristique du procédé selon l'invention, les données de mise à jour de terminal sont transférées par un échange transparent de messages radiotéléphoniques courts, de type SMS ou équivalent, à l'initiative de la plate-forme de programmation et en coopération avec le centre serveur, après authentications réciproques du terminal cible et de la plate-forme.

[0011] Selon une caractéristique d'une forme préférée de mise en oeuvre du procédé selon l'invention, un échange pour mise à jour avec un terminal comporte les opérations suivantes :

- envoi d'un message court d'éveil d'agent, de type MT, à destination du terminal, ce message comportant un en-tête caractéristique de mise à jour et des données pour le rappel radiotéléphonique de la plate-forme par le terminal;
- envoi d'un accusé de réception par message court, de type MO, à destination de la plate-forme par le terminal, suite à la réception d'un message d'éveil, cet accusé de réception contenant le numéro d'appel radiotéléphonique du terminal et une définition synthétique de la présente configuration matérielle et/ou logicielle du terminal;
- envoi d'un ou de plusieurs messages successifs, de type MT, au terminal pour la mise à jour, cet envoi contenant notamment les données de mise à jour, précédées par l'en-tête de mise à jour et par la nouvelle définition synthétique de configuration résultant de la mise à jour.

[0012] L'invention, ses caractéristiques et ses avantages sont précisés dans la description qui suit en liaison avec les figures évoquées ci-dessous.

[0013] La figure 1 est un schéma synoptique relatif au dispositif permettant de transmettre des messages courts par radio à des terminaux radiotéléphoniques à partir d'un centre serveur dans un système radiotéléphonique.

[0014] La figure 2 présente schématiquement les étapes essentielles pour un échange de mise à jour du logiciel d'un terminal selon l'invention par l'intermédiaire d'un centre serveur et à l'initiative d'une plate-forme de programmation.

[0015] Le système radiotéléphonique 1, schématisé en figure 1, est conçu pour assurer l'établissement de communications, dans le cadre d'un réseau radiotéléphonique, entre des terminaux radiotéléphoniques, tel que le terminal mobile 2. Le procédé selon l'invention est ici décrit dans le cadre d'un réseau radiotéléphonique cellulaire par exemple un réseau GSM, DCS ou PCS.

[0016] Le système 1 est supposé permettre la gestion d'un réseau de terminaux radiotéléphoniques 2, et en particulier des communications entre terminaux, il peut aussi permettre la mise en communication des terminaux du réseau avec d'autres terminaux de communication, desservis par d'autres systèmes qui sont reliés

de manière appropriée au réseau radiotéléphonique que gère le système 1.

**[0017]** Les terminaux radiotéléphoniques 2 gérés par un même système 1 dans le cadre d'un réseau radiotéléphonique constituent un ensemble 3 relevant classiquement d'un prestataire de service déterminé qui exploite le système 1 pour les opérations relatives aux communications radiotéléphoniques concernant les terminaux 2.

**[0018]** Chaque terminal radiotéléphonique 2 comporte, comme connu et non illustré ici, un émetteur-récepteur radio de signaux numériques ou numérisés incluant une interface d'émission-réception de signaux voix-données, une interface de commande manuelle homme-terminal et un ensemble de commande incorporant au moins un processeur et diverses mémoires, mortes et/ou vives. Le sous-ensemble constitué par ces mémoires stocke une partie des programmes nécessaires au fonctionnement du terminal, une autre partie est classiquement stockée dans un sous-ensemble mémoire comporté par un module d'identification d'abonné 4 amovible que l'utilisateur doit ajouter au terminal pour pouvoir l'exploiter. Un tel module d'identification est par exemple constitué par une carte SIM exploitable en liaison avec l'ensemble de commande du terminal, une fois mise en place.

**[0019]** Dans le cadre de l'invention, il est prévu que les caractéristiques logicielles et matérielles d'un terminal à un instant déterminé soient traduites sous forme d'informations numérisées qui sont mises en mémoire au niveau de ce terminal, c'est-à-dire dans le terminal lui-même et/ou dans le module d'identification qui lui est associé, suivant les cas. Les logiciels des terminaux 2 et des modules d'identification 4 sont réalisés de manière à permettre une transmission radiotéléphonique par un terminal d'informations relatives aux caractéristiques, matérielles et/ou logicielles, présentes de configuration de ce terminal. Ces informations sont combinées pour constituer une définition synthétique de configuration, dite SYNTHET, susceptible d'être émise par le terminal, sous le contrôle de l'ensemble de commande du terminal, suite à une demande émanant du système 1 par voie radiotéléphonique. Dans la forme de réalisation envisagée ici, cette définition de configuration SYNTHET est supposée traduire ces informations sous une forme standardisée qui regroupe les caractéristiques matérielles et logicielles essentielles d'un terminal 2. Elle est supposée transmise dans le cadre de procédures d'échange radiotéléphonique de messages courts qui ne sont pas développées ici dans la mesure où, normalisées, elles ont fait l'objet de diverses publications.

**[0020]** Comme connu, les communications radiotéléphoniques impliquant un terminal 2, dans le cadre du réseau GSM auquel il appartient, s'effectuent par l'intermédiaire d'une station radiotéléphonique de base 5 du système 1 auprès de laquelle ce terminal s'est localisé et à portée radio de laquelle il est situé. Tels seront donc

les échanges réalisés aux fins de mise à jour logicielle avec un terminal 2 dans le cadre du procédé selon l'invention.

**[0021]** Pour ces communications, la station de base 5, dite BTS, fait partie d'un des sous-systèmes radio, dit BSS, du système 1. Elle comporte un ou plusieurs équipements émetteurs-récepteurs radio d'interface avec les terminaux 2 et elle est supervisée par un contrôleur de gestion de ressource radio, dit BSC, qui assure aussi un premier niveau de concentration de circuits de communication vers un des centres de commutation de services mobiles 6, dit MSC, d'un sous-réseau fixe de communication, non représenté, du système 1.

**[0022]** Dans le cas du terminal 2 considéré et de la procédure de mise à jour, le centre de commutation 6 concerné est celui qui supervise la station de base 5 auprès de laquelle le terminal 2 est radiotéléphoniquement localisé et sous la responsabilité duquel ce terminal 2 se trouve à ce moment. Une base de données 7, dite VLR, est associée à chaque centre de commutation 6 pour stocker des données, relatives aux terminaux dits présents dans la mesure où ils sont alors radiotéléphoniquement localisés auprès d'une des stations de base supervisées par le centre 6. Comme il est connu, les différents abonnés d'un réseau de type GSM sont aussi répertoriés au niveau d'un enregistreur de localisation nominal 8, dit HLR. Cet enregistreur 8 mémorise les caractéristiques de chaque abonné du réseau et notamment son numéro d'identité international IMSI, son numéro d'annuaire et son profil d'abonnement, et il communique avec les différentes bases 7 du système, dans le cadre des procédures de localisation des différents terminaux par rapport aux stations de base fixes du réseau.

**[0023]** Les centres de commutation 6 du système 1 sont aussi reliés à un centre de commutation 9 ayant une fonction passerelle exploitée pour un service bidirectionnel de messages courts, dits SMS, à destination des terminaux à partir d'un serveur 10, dit SC.

**[0024]** Ce serveur 10 comporte des moyens de communication par lequel il est notamment relié au centre de commutation 9, un ensemble de commande et des moyens de stockage de données en particulier pour la mémorisation des messages courts destinés aux terminaux, de manière à permettre leur conservation jusqu'au moment où ces terminaux sont à même de les recevoir. Cette conservation a notamment lieu lorsqu'un terminal est hors d'atteinte, par exemple lorsqu'il est hors tension ou hors couverture. La communication s'effectue alors dès que le terminal se manifeste d'une manière ou d'une autre au niveau du réseau.

**[0025]** Les messages courts destinés aux terminaux du réseau radiotéléphonique sont susceptibles d'être fournis par différentes sources. Ils comportent classiquement une partie d'en-tête où est notamment identifié le destinataire, une partie prévue pour un volume déterminé de données de commande et une partie prévue pour des données d'affichage destinées à apparaître

sur l'écran que comporte classiquement un terminal.

**[0026]** Dans le cas de messages courts de mise à jour de logiciel, il est prévu une intervention d'une source constituée par une plate-forme de programmation 11 qui produit les données correspondant aux informations de mise à jour, par exemple sous forme usuelle d'un lot de données prévu pour au moins un terminal ou plus généralement plusieurs terminaux similairement configurés.

**[0027]** Cette plate-forme 11, qui est apte à communiquer avec le serveur 10, peut être incluse dans le système 1 ou encore lui être extérieure comme schématisé sur la figure 1. Elle est donc agencée pour pouvoir entrer en communication avec l'ensemble de commande et avec les moyens de stockage du serveur 10, soit directement si elle est intégrée dans ce serveur soit via les moyens de communication dont ce serveur dispose.

**[0028]** Selon l'invention et comme déjà indiqué, il est prévu que la mise à jour d'un terminal s'effectue suite à un échange de données, sous forme de messages courts entre la plate-forme de programmation 11 et le terminal 2 par l'intermédiaire du serveur 10, sans imposer une d'intervention de l'utilisateur au niveau du terminal.

**[0029]** Une opération d'identification du ou des terminaux destinés à faire l'objet d'une mise à jour est donc nécessaire. Elle implique donc que soient répertoriés les éléments constitutifs matériels et/ou logiciels, propres aux terminaux du réseau qui sont concernés par une mise à jour, pour que soient déterminés ceux de ces terminaux qui comportent ces éléments et qui sont donc concernés par la mise à jour.

**[0030]** Les opérations nécessaires pour de telles identifications ne sont pas développées ici dans la mesure où elles n'ont qu'un rapport indirect avec l'objet de l'invention. Il suffit de savoir qu'un lien d'identification individuel est défini au niveau du système 1 en tenant compte des données individuelles d'identification et de localisation stockées aux niveaux des bases de données 7 et de l'enregistreur 8 et des données de définition des caractéristiques logicielles et matérielles pour chaque terminal. En effet, il est usuel que ces données de définition relatives aux terminaux ne soient pas ou pas toutes stockées au niveau du système 1, si ce n'est au niveau des terminaux eux-mêmes.

**[0031]** Le procédé de mise à jour selon l'invention implique donc un échange transparent qui est initié pour un terminal dont les caractéristiques logicielles et matérielles présentes ont été obtenues de celui ou de ceux qui les détiennent, afin de pouvoir réaliser une vérification de conformité en liaison avec le terminal où ces caractéristiques sont aussi stockées.

**[0032]** Selon l'invention, une procédure de transfert de données de mise à jour vers un terminal commence par l'envoi d'un message court, dit d'éveil d'agent au terminal destinataire visé, à l'initiative de la plate-forme de programmation 11 et par l'intermédiaire du serveur de messages courts 10. Ce message d'éveil est de type

MT (module terminated), par exemple SMS-MT, il comporte un en-tête caractéristique signalant qu'il s'agit d'une opération de mise à jour. Ce message contient éventuellement des données d'affichage permettant de fournir une information sur l'écran du terminal relativement à la mise à jour.

**[0033]** Le message d'éveil contient aussi des données destinées à permettre au terminal de répondre par message court de type MO (mobile originated), par exemple SMS-MO. Ces données fournissent au terminal des indications relatives à l'origine du message qu'il a reçu, dans l'exemple proposé ces données correspondent au numéro du centre serveur de messages courts 10 et celui du service de ce centre qui identifie la plate-forme de programmation 11.

**[0034]** Une opération d'authentification de la plate-forme par le terminal est réalisée.

**[0035]** Un message court d'accusé de réception est transmis en retour vers le centre serveur par le terminal, si le message court d'éveil a été transféré avec succès au terminal destinataire depuis le centre serveur et via la station de base auprès de laquelle ce terminal est localisé. Le procédé est temporairement interrompu par le centre serveur dans les conditions habituelles prévues lorsqu'un terminal est hors d'atteinte ou si le transfert n'a pas été réalisé de manière satisfaisante. Il est notamment interrompu, si l'opération d'authentification de la plate-forme de programmation par le terminal a échoué.

**[0036]** Le message d'accusé de réception produit par un terminal contient le numéro d'appel radiotéléphonique du terminal et la définition synthétique SYNTERH spécifiant ses présentes caractéristiques de configuration, matérielles et logicielles, essentielles. Il peut alternativement être envisagé de ne transmettre qu'une partie de ces caractéristiques, si cela s'avère suffisant.

**[0037]** Ce message d'accusé de réception est transféré par le terminal vers le centre serveur 10, via la station de base 5 auprès de laquelle il est alors radiotéléphoniquement localisé. Ce transfert s'effectue de manière transparente, sans que l'utilisation du terminal par un utilisateur ne soit affectée.

**[0038]** L'envoi d'un ou de plusieurs messages contenant les données de mise à jour peut être effectué par l'intermédiaire du centre serveur, à réception du message d'accusé de réception et après authentification du terminal cible par vérification de la conformité de la définition de configuration SYNTERH reçue du terminal avec celle prise en compte pour ce terminal à l'occasion du lancement de la procédure de transfert. L'en-tête caractéristique de signalisation de la mise à jour est à nouveau transmis vers le terminal 2 dans le cadre du premier message de type MT de transmission des données de mise à jour qu'émet le centre serveur vers ce terminal. Cet en-tête précède des données correspondant à tout ou partie de l'ensemble formé par les données de mise à jour suivant la taille de cet ensemble.

**[0039]** Une autre mise en oeuvre consiste à ne pas

procéder à des vérifications de la configuration SYN-  
THER, mais à décider en fonction de celle-ci de l'oppor-  
tunité d'une mise à jour. Ainsi, la plate-forme de pro-  
grammation peut n'avoir aucune connaissance (ou une  
connaissance partielle) de la configuration d'un parc de  
terminaux mobiles. Souhaitant en faire une mise à ni-  
veau des différentes versions d'un module logiciel (par  
exemple), on envoi sur le réseau un message d'éveil  
d'agent comme décrit précédemment. Les terminaux ré-  
pondent en fournissant leurs configurations SYN-  
THER. En fonction de ces configurations, la plate-forme peut  
décider quels terminaux mobiles nécessitent une mise  
à jour, parmi l'ensemble des terminaux mobiles du parc  
cible.

**[0040]** Les données de mise à jour sont accompa-  
gnées par des données correspondant à la nouvelle dé-  
finition de configuration SYN-  
THER établie pour le ter-  
minal à partir de la définition jusqu'ici en cours et de la  
ou des modifications entraînée(s) par la mise à jour,  
pour enregistrement au niveau du terminal.

**[0041]** Dans l'exemple illustré sur la figure 2, des don-  
nées supplémentaires sont jointes pour permettre au  
terminal de vérifier qu'il est bien le destinataire prévu du  
ou des messages de mise à jour. Ces données supplé-  
mentaires de contrôle sont par exemple celles de la dé-  
finition de configuration SYN-  
THER telle que préalablement envoyée par le centre serveur à récep-  
tion du message d'éveil. Elles sont prises en compte et  
traitées par l'ensemble de commande du terminal éven-  
tuellement en relation avec l'ensemble de commande à  
processeur et mémoires que comporte le module  
d'identification alors associé à ce terminal. Les données  
de mise à jour, reçues dans une mémoire du terminal,  
sont enregistrées, pour mise en exploitation, en mémoi-  
re permanente du terminal et/ou du module d'identifica-  
tion alors associé à ce terminal, lorsque les vérifications  
effectuées sont satisfaisantes.

**[0042]** Dans une forme de réalisation également illus-  
trée sur la figure 2, un message court d'accusé de bonne  
réception de mise à jour est transmis par le terminal vers  
le centre serveur 10, suite à la réussite de la vérification  
effectuée par ce terminal. Ce message, de type MO,  
comporte ici des données correspondant au numéro  
d'appel propre à ce terminal et la nouvelle définition de  
configuration SYN-  
THER qui vient d'être reçue du centre  
serveur par le terminal.

**[0043]** Si l'une des étapes de transmission prévues  
dans le procédé de mise à jour selon l'invention n'est  
pas réalisée de manière satisfaisante et risque de con-  
duire à une erreur soit au niveau du terminal, du module  
d'identification associé à ce terminal ou au niveau du  
centre serveur et/ou de la plate-forme de programma-  
tion concernée, les modifications envisagées ne sont  
pas effectuées et les données correspondant à la situa-  
tion précédant la tentative de mise à jour sont conser-  
vées jusqu'à réussite d'une nouvelle tentative de mise  
à jour.

**[0044]** Il est prévu que la réalisation effective d'une

opération de mise à jour pour un terminal déterminé soit  
signalée à l'utilisateur par affichage d'une information  
appropriée sur l'écran du terminal, si besoin est.

**[0045]** L'exploitation du procédé de mise à jour au  
profit de terminaux radiotéléphoniques d'un réseau  
n'implique généralement qu'une programmation addi-  
tionnelle au niveau des moyens logiciels respective-  
ment prévus dans ces terminaux, pour assurer l'explo-  
itation de la procédure de transmission par messages  
courts au cours des différentes étapes de déroulement  
du procédé. De ce fait la structure matérielle d'un termi-  
nal 2 n'est pas développée ici dans la mesure où elle  
est susceptible d'être tout à fait classique et donc bien  
connue de l'homme de métier.

**[0046]** Il est notamment prévu au moins un agent au  
niveau du terminal pour repérer le code caractéristique  
d'un en-tête de mise à jour au niveau d'un message  
court et pour piloter les opérations réalisées par le ter-  
minal pour permettre le déroulement des étapes du pro-  
cédé de mise à jour.

## Revendications

1. Procédé pour la mise à jour du logiciel d'un terminal  
radiotéléphonique (2), notamment de type GSM,  
par l'intermédiaire d'une station de base (5), radio-  
téléphonique, auprès de laquelle ledit terminal est  
radiotéléphoniquement localisé, et à partir des don-  
nées fournies par une plate-forme de programma-  
tion (11) intervenant au niveau d'un centre serveur  
(10) auquel la station de base est reliée dans le ca-  
dre d'un réseau de télécommunications, les don-  
nées de mise à jour du terminal étant transférées  
par un échange de messages courts, de type SMS  
ou équivalent, à l'initiative de la plate-forme de pro-  
grammation et en coopération avec le centre ser-  
veur, ce procédé étant caractérisé en ce que ledit  
échange de messages courts comporte des mes-  
sages préalables pour l'authentification réciproque  
dudit terminal cible et de ladite plate-forme de pro-  
grammation.
2. Procédé selon la revendication 1, dans lequel ledit  
échange de messages courts comporte les opéra-  
tions suivantes :
  - envoi d'un message court d'éveil d'agent, de ty-  
pe MT, à destination du terminal, ce message  
comportant un en-tête caractéristique de mise  
à jour et des données pour le rappel radiotélé-  
phonique de la plate-forme par le terminal;
  - envoi d'un accusé de réception par message  
court, de type MO, à destination de la plate-for-  
me par le terminal, suite à la réception d'un  
message d'éveil, cet accusé de réception con-  
tenant préférentiellement le numéro d'appel radio-  
téléphonique du terminal et une définition syn-



- thétique (SYNTHET) de la présente configuration matérielle et/ou logicielle du terminal;
- envoi d'un ou de plusieurs messages successifs, de type MT, au terminal pour la transmission de l'information de mise à jour, cet envoi contenant notamment les données de mise à jour, précédées par l'en-tête de mise à jour et par la nouvelle définition synthétique de configuration résultant de la mise à jour.
3. Procédé, selon la revendication 2, dans lequel l'envoi de données effectué par la plate-forme au terminal pour une mise à jour contient aussi la définition synthétique de configuration reçue du terminal.
4. Procédé, selon l'une des revendications 1 à 3, dans lequel il est prévu un envoi par le terminal d'un message d'accusé de réception de mise à jour, de type MO, suite à la mise à jour, ce message comportant préférentiellement le numéro d'appel radiotéléphonique du terminal accompagné de la nouvelle définition synthétique de configuration reçue dans le cadre de la mise à jour.
5. Terminal radiotéléphonique, de type GSM ou équivalent, caractérisé en ce qu'il comporte des moyens logiciels pour la mise en oeuvre du procédé selon l'une des revendications précédentes 1 à 4.

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FIG. 1

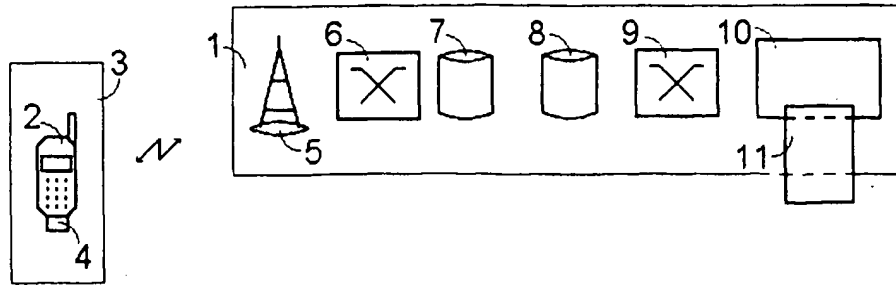
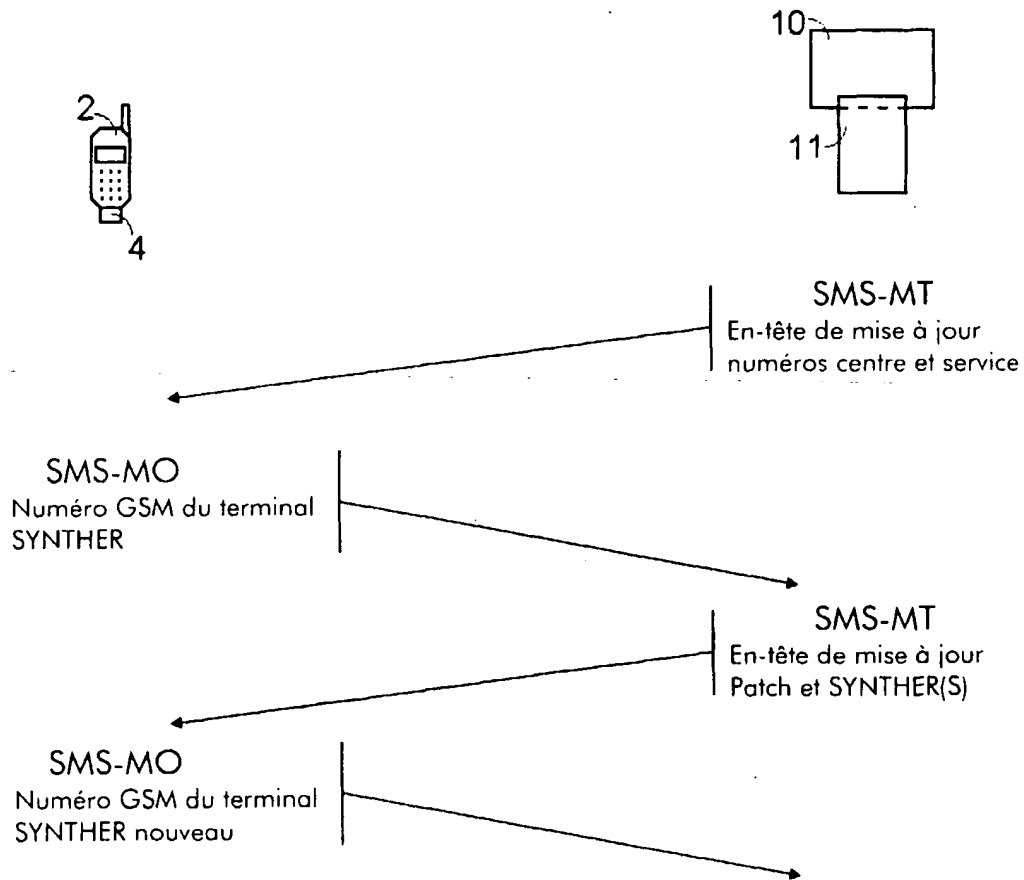


FIG. 2





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RAPPORT DE RECHERCHE EUROPEENNE

Numéro de la demande  
EP 99 40 2529

DOCUMENTS CONSIDERES COMME PERTINENTS			
Catégorie	Citation du document avec indication, en cas de besoin, des parties pertinentes	Revendication concernée	CLASSEMENT DE LA DEMANDE (Int.Cl.7)
X	EP 0 562 890 A (HUTCHISON MICROTEL LIMITED) 29 septembre 1993 (1993-09-29) * colonne 2, ligne 33 - colonne 7, ligne 10 *	1-5	H04Q7/32
A	COLLESI S ET AL: "SMS BASED APPLICATIONS FOR GSM NETWORKS" TECHNICAL REPORTS - CSELT, vol. 23, no. 3, 1 juin 1995 (1995-06-01), pages 337-349, XP000573777 * page 339, colonne de droite, ligne 5 - page 340, colonne de droite, ligne 18 *	2,3	
			DOMAINES TECHNIQUES RECHERCHES (Int.Cl.7)
			H04Q
Le présent rapport a été établi pour toutes les revendications			
Lieu de la recherche LA HAYE		Date d'achèvement de la recherche 14 janvier 2000	Examineur López-Pérez, M-C
CATEGORIE DES DOCUMENTS CITES		T : théorie ou principe à la base de l'invention E : document de brevet antérieur, mais publié à la date de dépôt ou après cette date D : cité dans la demande L : cité pour d'autres raisons	
X : particulièrement pertinent à lui seul Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie A : arrière-plan technologique O : divulgation non-écrite P : document intercalaire		& : membre de la même famille, document correspondant	

EPO FORM 1503 03.82 (F04C02)

**ANNEXE AU RAPPORT DE RECHERCHE EUROPEENNE  
RELATIF A LA DEMANDE DE BREVET EUROPEEN NO.**

EP 99 40 2529

La présente annexe indique les membres de la famille de brevets relatifs aux documents brevets cités dans le rapport de recherche européenne visé ci-dessus.  
Lesdits membres sont contenus au fichier Informatique de l'Office européen des brevets à la date du  
Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office européen des brevets.

14-01-2000

Document brevet cité au rapport de recherche	Date de publication	Membre(s) de la famille de brevet(s)	Date de publication
EP 0562890    A	29-09-1993	AUCUN	
Empty area for additional patent family members			

EPO FORM P0480

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No. 12/82

AO

(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

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H04Q 7/38		H04B 7/26 H04Q 7/04	109M D

審査請求 未請求 請求項の数24 OL (全12頁)

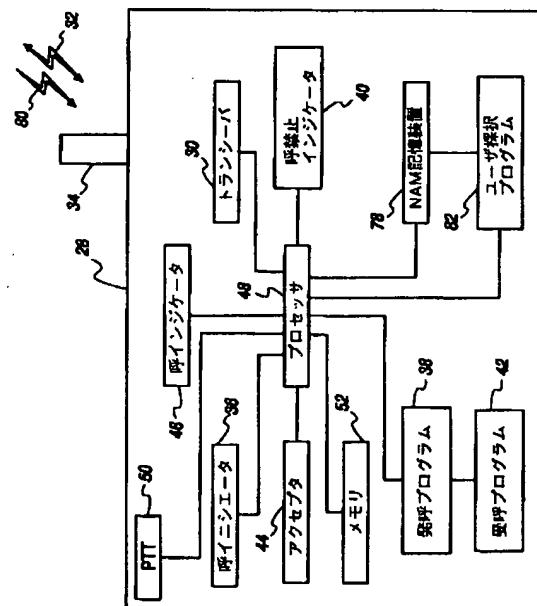
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(32) 優先日	平成10年9月4日 (1998.9.4)	(74) 代理人	100066692 弁理士 浅村 皓 (外3名)
(33) 優先権主張国	米国 (US)		

(54) 【発明の名称】 移動局およびそのメモリ内に格納されるユーザ採択情報を自動的に変更する方法

(57) 【要約】

【課題】 空中伝搬により通信信号を送受信する移動局を提供する。

【解決手段】 移動局28はユーザ採択情報を格納するメモリ52、ユーザ採択情報を含む空中伝搬情報信号を受信するようにされた受信機44、および受信空中伝搬情報信号内のユーザ採択情報に従ってメモリ内のユーザ採択プログラム82を含む移動局内のユーザ採択プログラム82を含んでいる。移動局28はマスターコントロールユニットにおける選択ユーザ採択情報入力を含む空中伝搬情報を送信するように選択的に始動可能なマスターコントロールユニットから遠隔地にある。



【特許請求の範囲】

【請求項1】 空中伝搬により通信信号を送受信する移動局であって、

ユーザ採択情報を格納するメモリと、ユーザ採択情報を含む空中伝搬情報信号を受信するようにされた受信機と、

受信した空中伝搬情報信号内のユーザ採択情報に従ってメモリ内のユーザ採択情報を変更するようにされた移動局内のユーザ採択プログラムと、を含む移動局。

【請求項2】 請求項1記載の移動局であって、前記受信機が、R-D a t aトランスポートネットワークを介して空中伝搬情報信号を受信するようにされている、移動局。

【請求項3】 請求項1記載の移動局であって、前記メモリ内に格納されるユーザ採択情報が、グループ電話番号情報および標準電話番号情報を含み、前記ユーザ採択プログラムが、受信ユーザ情報信号に回答して、グループ電話番号情報を変更しかつ標準電話番号情報を変更するようにされている、移動局。

【請求項4】 請求項3記載の移動局であって、前記メモリ内に格納されるグループ電話番号情報がグループ電話番号を含む、移動局。

【請求項5】 請求項4記載の移動局であって、前記グループ電話番号情報が各グループ電話番号に関連するアルファニューメリック識別子を含む、移動局。

【請求項6】 請求項4記載の移動局であって、前記グループ電話番号情報が各グループ電話番号に対するローム受信イネーブルフラグおよびローム発信イネーブルフラグをさらに含み、前記ローム受信イネーブルフラグは関連するグループ電話番号から前記移動局への呼の受信を選択的にイネーブル/ディスエーブルし、前記ローム発信イネーブルフラグは前記移動局から関連するグループ電話番号への呼の発信を選択的にイネーブル/ディスエーブルする、移動局。

【請求項7】 請求項3記載の移動局であって、前記メモリ内に格納される標準電話番号情報が標準電話番号を含む、移動局。

【請求項8】 請求項7記載の移動局であって、標準電話番号情報が各標準電話番号に関連するアルファニューメリック識別子をさらに含む、移動局。

【請求項9】 請求項4記載の移動局であって、前記ユーザ採択プログラムが、受信したユーザ情報信号に回答して、前記メモリにグループ電話番号を追加したり削除したりするようにされている、移動局。

【請求項10】 請求項9記載の移動局であって、前記メモリの選択された量が、グループ電話番号情報を格納するのに割り当てられ、前記ユーザ採択プログラムが、グループ電話番号を追加した受信ユーザ情報信号に回答して、割り当てられる前記メモリの選択された量を増加するようにされている、移動局。

【請求項11】 請求項1記載の移動局であって、前記メモリ内に格納されるユーザ採択情報が、呼を受信する前記移動局の能力を制限するように選択的に設定可能な受信ロックユーザ採択情報と、呼を発信する前記移動局の能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報とを含み、前記ユーザ採択プログラムが、受信したユーザ採択信号に回答して、受信ロックおよびダイヤルロックユーザ採択情報を変更するようにされている、移動局。

【請求項12】 呼を送受信する移動局の能力を選択的に制御するシステムであって、

呼を送受信する選択移動局の能力を規定する選択ユーザ採択情報を含む空中伝搬情報信号を送信するために選択的に動作可能なマスターコントロールユニットと、前記マスターコントロールユニットから遠隔の移動局であって、

前記移動局に対するユーザ採択情報を格納するメモリと、

前記マスターコントロールユニットからの空中伝搬情報信号を受信するようにされた受信機と、

前記マスターコントロールユニットから受信する空中伝搬情報信号内の選択ユーザ採択情報に従って前記メモリ内のユーザ採択情報を変更するようにされている前記移動局内のユーザ採択プログラムと、

を含む移動局と、を含むシステム。

【請求項13】 請求項12記載のシステムであって、前記マスターコントロールユニットが、R-D a t aトランスポートネットワークを介して空中伝搬情報信号を送信する、システム。

【請求項14】 請求項12記載のシステムであって、前記ユーザ採択情報が、グループ電話番号情報および標準電話番号情報を含み、前記ユーザ採択プログラムが、受信した情報信号に回答して、前記メモリ内のグループ電話番号情報および標準電話番号情報を変更するようにされている、システム。

【請求項15】 請求項14記載のシステムであって、前記グループ電話番号情報がグループ電話番号を含む、システム。

【請求項16】 請求項15記載のシステムであって、前記グループ電話番号情報が各グループ電話番号に対するローム受信イネーブルフラグおよびローム発信イネーブルフラグをさらに含み、前記ローム受信イネーブルフラグは関連するグループ電話番号から前記移動局への呼の受信を選択的にイネーブル/ディスエーブルし、前記ローム発信イネーブルフラグは前記移動局から関連するグループ電話番号への呼の発信を選択的にイネーブル/ディスエーブルする、システム。

【請求項17】 請求項12記載のシステムであって、前記メモリ内に格納されるユーザ採択情報が、呼を受信

する前記移動局の能力を制限するように選択的に設定可能な受信ロックユーザ採択情報と、呼を発信する前記移動局の能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報とを含み、

前記ユーザ採択プログラムが、受信した情報信号にตอบสนองして、受信およびダイヤルロックユーザ採択情報を変更するようにされている、システム。

【請求項18】 請求項12記載のシステムであって、前記マスターコントロールユニットが、呼を送受信する選択移動局の能力を規定するユーザ採択情報を選択的に入力するユーザ制御可能入力装置と、ユーザ制御可能入力装置から入力されるユーザ採択情報を受信し、該ユーザ採択情報を含む空中伝搬情報信号を選択移動局へ送信するメッセージセンターと、を含む、システム。

【請求項19】 請求項18記載のシステムであって、前記ユーザ制御可能入力装置が、ディスプレイ、メモリ、コンピュータの動作を制御するユーザ入力装置、およびユーザ採択再構成プログラムを有するコンピュータを含む、システム。

【請求項20】 ワイヤレス通信システムに使用する移動局のメモリ内に格納されたユーザ採択情報を自動的に変更する方法であって、

(a) ユーザ採択情報を含む空中伝搬情報信号を受信するステップと、

(b) 受信した空中伝搬情報信号内のユーザ採択情報に従ってメモリ内のユーザ採択情報を自動的に変更するステップと、を含む方法。

【請求項21】 請求項20記載の方法であって、前記メモリ内に格納されるユーザ採択情報が、グループ電話番号情報および標準電話番号情報を含み、ステップ

(b) が、受信したユーザ情報信号にตอบสนองして、グループ電話番号情報および／もしくは標準電話番号情報を自動的に変更するステップを含む、方法。

【請求項22】 請求項21記載の方法であって、前記メモリの選択された量が、グループ電話番号情報を格納するのに割り当てられ、ステップ(b)が、受信したユーザ情報信号にตอบสนองして、前記メモリの選択された量を自動的に変更するステップを含む、方法。

【請求項23】 請求項20記載の方法であって、前記メモリ内に格納されるユーザ採択情報が、呼を受信する前記移動局の能力を制限するように選択的に設定可能な受信ロックユーザ採択情報と、呼を発信する前記移動局の能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報とを含み、ステップ(b)が、受信したユーザ採択信号にตอบสนองして受信ロックおよびダイヤルロックユーザ採択情報を自動的に変更するステップを含む、方法。

【請求項24】 呼を送受信する移動局の能力を選択的に制御する方法であって、前記移動局はユーザ採択情報

を格納するメモリを含み、

マスターコントロールユニットにおいて、呼を送受信する選択移動局の能力を規定する選択ユーザ採択情報を含む空中伝搬情報信号を送信するステップと、

前記選択移動局において、選択ユーザ採択情報を含む送信された空中伝搬情報信号を受信するステップと、

受信した空中伝搬情報信号内の選択ユーザ採択情報に従って、前記メモリ内のユーザ採択情報を自動的に変更するステップと、を含む方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は移動通信局のプログラミングに向けられ、特に特定ユーザ情報による移動局のプログラミングに向けられている。

【0002】

【従来の技術】移動局のプログラミングはかなりよく知られている。移動局(たとえば、セルラー電話機)を購入したら、ユーザは一般的に電話機をサービスプロバイダ(Cellular One, U. S. Cellular, 等)へ持ち込んでそれを始動させる。ユーザが口座を開くと、サービスプロバイダはユーザの電話機をNAM(番号割当てモジュール)情報によりプログラムして、サービスプロバイダにより提供されるシステム内で作動するように電話機を構成する。始動されると、サービスプロバイダにより提供される強化された特徴を付加したい場合、あるいは既に加入している強化された特徴を消去したい場合に、ユーザは移動局をサービスプロバイダへ持ち込んで強化された特徴を自分の口座に付加したりそこから削除しなければならない。

【0003】また、一般的に、移動局にはR-Data(アール・データ)トランスポート機構を介して空中伝搬(over the air)によりNAM情報を受信する能力がある。一般的にNAM情報はさまざまなレベルに分類され、セキュリティその他の理由から空中伝搬により移動局へ送信できるのは決まった情報だけである。空中伝搬によるNAM情報の伝送はレベルには依存せず、送られるNAM情報の特定のタイプに依存する。前記したように、NAM情報は限定はしないがIS-136システム等の中で作動するセルラー通信システムに移動局がどのようにインタラクトしアクセスするかを一般的に制御する。

【0004】例えば、ベンダーから移動局(例えば、セルラー電話機)を購入するユーザが始動のために電話機をサービスプロバイダ(Cellular One, U. S. Cellular, 等)へ物理的に持ち込まずに自分の電話機を始動させたいことがある。サービスプロバイダのサービスショップがユーザから地理的に遠ざかり、ユーザに電話機を持ち込んで始動させるための時間がないことがある。ユーザは購入したセルラー電話機以外の電話機により随意サービスプロバイダとコンタ

クトして、クレジットカード番号を教えるサービスプロバイダに空中伝搬によりセルラー電話機を始動させることができる。始動は基本的にサービスプロバイダがそのシステム内でインタラクトする電話機を構成するNAM情報を空中伝搬によりダウンロードすることからなる。それにより、ユーザは時間およびサービスプロバイダのサービスショップへ物理的に足を運ぶ不便さから免れる。ダウンロードされたNAM情報のいくらかは同様に変更することができる。しかしながら、前記したように、全てのNAM情報を空中伝搬により送信することはできない。

【0005】仕事で使うために会社が従業員にセルラー電話機のような移動局を配る場合、会社は従業員が移動局をそのホームシステムから持ち出す、すなわち、ローミングしている時に従業員が発呼もしくは受呼することを望まないことがある。あるいは、従業員がそのホームシステムから移動局を持ち出している時は、従業員が決まった呼しか発信もしくは受信しないことを望むことがある。現在、この種のユーザ採択情報はメニュー駆動されるため、会社は従業員に命令して移動局をそのサービスショップへ物理的に持ち込んで再構成させなければならない。それは会社および遠隔地の従業員の両方にとって非常に不便である。

【0006】同じ不便さは家族の構成員、すなわち、子供達のために移動局を購入する両親にもつきまとう。離れた大学にいて900#呼出し、長距離呼出し、等を行うことにより両親の寛容さを乱用する子供の両親は、これらの料金を背負い込み続けるかサービスプロバイダに電話機を使用不能にさせるしか方法がない。両親にとって従来の有線電話機へのアクセスがない非常事態において移動局は非常に役立つため、両親は電話機を使用不能とすることには躊躇し、自分の子供がかかる電話の料金を背負い込み続けるしかないことがある。

【0007】

【発明が解決しようとする課題】本発明は前記した問題点の1つ以上を克服することに向けられている。

【0008】

【課題を解決するための手段】空中伝搬により通信信号を送受信する移動局が提供され、移動局はユーザ採択(preference)情報を格納するメモリ、ユーザ採択情報を含む空中伝搬情報信号を受信するようにされた受信機、および受信空中伝搬情報信号内のユーザ採択情報に従ってメモリ内のユーザ採択情報を変更するようにされた移動局内のユーザ採択プログラムを含んでいる。

【0009】一形式において、受信機はR-d a t aトランスポートネットワークを介して空中伝搬情報信号を受信するようにされている。

【0010】もう1つの形式において、メモリ内に格納されるユーザ採択情報はグループ電話番号情報および標

準電話番号情報を含み、ユーザ採択プログラムは受信ユーザ情報信号に応答してグループ電話番号情報を変更し、かつ標準電話番号情報を変更するようにされている。

【0011】別の形式では、メモリ内に格納されるグループ電話番号情報はグループ電話番号および各グループ電話番号に関連するアルファニューメリック識別子を含んでいる。

【0012】もう1つの形式では、グループ電話番号情報はさらに各グループ電話番号に対するローム受信イネーブルフラグおよびローム発信イネーブルフラグを含み、ローム受信イネーブルフラグは関連するグループ電話番号からの移動局における呼の受信を選択的にイネーブル/ディスエーブルし、ローム発信イネーブルフラグは関連するグループ電話番号への移動局における呼の発信を選択的にイネーブル/ディスエーブルする。

【0013】別の形式では、メモリ内に格納される標準電話番号情報は標準電話番号および各標準電話番号に関連するアルファニューメリック識別子を含んでいる。

【0014】もう1つの形式では、ユーザ採択プログラムは受信ユーザ情報信号に応答してグループ電話番号をメモリに追加および削除するようにされている。

【0015】さらにもう1つの形式では、予め選定された量のメモリがグループ電話番号情報を格納するために割り当てられ、ユーザ採択プログラムはグループ電話番号を追加した受信ユーザ情報信号に応答して割り当てられる選定された量のメモリを増大するようにされている。

【0016】さらにもう1つの形式では、メモリ内に格納されるユーザ採択情報は、着呼を受信する移動局の能力を制限するように選択的に設定可能な受信ロックユーザ採択情報と、呼を発信する移動局の能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報とを含み、ユーザ採択プログラムは、受信ユーザ採択信号に応答して、受信ロックおよびダイヤルロックユーザ採択情報を変更するようにされている。

【0017】また、移動局の発呼および/もしくは受呼能力を選択的に制御するシステムも提供され、それは選択移動局の発呼および/もしくは受呼能力を規定する選択ユーザ採択情報を含む空中伝搬情報信号を送信するように選択的に始動可能なマスターコントロールユニットを含んでいる。マスターコントロールユニットから遠隔の移動局はそのユーザ採択情報を格納するメモリ、マスターコントロールユニットからの空中伝搬情報信号を受信するようにされた受信機、およびマスターコントロールユニットからの空中伝搬情報信号内に受信される選択ユーザ採択情報に従ってメモリ内のユーザ採択情報を変更するようにされたユーザ採択プログラムを含んでいる。

【0018】一形式では、マスターコントロールユニットは空中伝搬情報信号をR-d a t aトランスポートネ



ネットワークを介して伝送する。

【0019】もう1つの形式では、ユーザ採択情報はグループ電話番号情報および標準電話番号情報を含み、ユーザ採択プログラムは受信情報信号に回答してメモリ内のグループ電話番号情報および標準電話番号情報を変更するようにされている。

【0020】さらにもう1つの形式では、グループ電話番号情報はさらに各グループ電話番号に対するローム受信イネーブルフラグおよびローム発信イネーブルフラグを含み、ローム受信イネーブルフラグは関連するグループ電話番号からの移動局における呼の受信を選択的にイネーブル/ディスエーブルし、ローム発信イネーブルフラグは関連するグループ電話番号への移動局における呼の発信を選択的にイネーブル/ディスエーブルする。

【0021】さらにもう1つの形式では、メモリ内に格納されるユーザ採択情報は移動局の着呼受信能力を制限するように選択的に設定可能な受信ロックユーザ採択情報、および移動局の呼発信能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報を含み、ユーザ採択プログラムは、受信情報信号に回答して、受信およびダイヤルロックユーザ採択情報を変更するようにされている。

【0022】もう1つの形式では、マスターコントロールユニットは選択移動局の発呼および/もしくは受呼能力を規定するユーザ採択情報を選択的に入力するユーザ可制御入力装置、およびユーザ可制御入力装置から入力ユーザ採択情報を受信し、ユーザ採択情報を含む、空中伝搬情報信号を選択移動局へ送信するメッセージセンターを含んでいる。

【0023】さらにもう1つの形式では、ユーザ可制御入力装置はディスプレイ、メモリおよびコンピュータの動作を制御するユーザ入力装置、およびコンピュータ内で作動するユーザ採択再構成プログラム有するコンピュータを含んでいる。

【0024】本発明のもう1つのアспектにおいて、ユーザ採択情報を格納するメモリを含むワイヤレス通信システムで使用する移動局に、(a) ユーザ採択情報を含む空中伝搬情報信号を受信するステップと、(b) 受信空中伝搬情報信号内のユーザ採択情報に従ってメモリ内のユーザ採択情報を自動的に変更するステップとを含む、メモリ内に格納されたユーザ採択情報を自動的に変更する方法が提供される。

【0025】一形式では、メモリ内に格納されるユーザ採択情報はグループ電話番号情報および標準電話番号情報を含み、ステップ(b)は受信ユーザ情報信号に回答してグループ電話番号情報および/もしくは標準電話番号情報を自動的に変更するステップを含んでいる。

【0026】もう1つの形式では、メモリ内に格納されるグループ電話番号情報はグループ電話番号、各グループ電話番号に対するローム受信イネーブルフラグを含

み、ローム受信イネーブルフラグは関連するグループ電話番号からの移動局における呼の受信を選択的にイネーブル/ディスエーブルし、さらに各グループ電話番号に対するローム発信イネーブルフラグを含み、ローム発信イネーブルフラグは関連するグループ電話番号への移動局における呼の発信を選択的にイネーブル/ディスエーブルする。

【0027】もう1つの形式では、標準電話番号情報は標準電話番号を含んでいる。

【0028】さらにもう1つの形式では、グループ電話番号情報を格納するための選定量のメモリが割り当てられ、ステップ(b)は受信ユーザ情報信号に回答して選定量のメモリを自動的に変更するステップを含んでいる。

【0029】さらにもう1つの形式では、メモリ内に格納されるユーザ採択情報は移動局の着呼受信能力を制限するように選択的に設定可能な受信ロックユーザ採択情報、および移動局の呼発信能力を制限するように選択的に設定可能なダイヤルロックユーザ採択情報を含み、ステップ(b)は、受信ユーザ採択信号に回答して、受信ロックおよびダイヤルロックユーザ採択情報を自動的に変更するステップを含んでいる。

【0030】移動局の発呼および受呼能力を選択的に制御する方法も提供される。この方法は選択移動局の発呼および/もしくは受呼能力を規定する選択ユーザ採択情報を含む空中伝搬情報信号をマスターコントロールユニットにおいて送信するステップと、選択ユーザ採択情報を含む送信空中伝搬情報信号を選択移動局において受信するステップと、受信空中伝搬情報信号内の選択ユーザ採択情報に従ってメモリ内のユーザ採択情報を自動的に変更するステップと、を含んでいる。

【0031】移動局の改善された使用制御を提供することが本発明の目的である。

【0032】所有者がその移動局の他人による使用を選択的に制御できるようにすることも本発明の目的である。

【0033】所有者がその移動局を迅速かつ容易に使用構成できるようにすることが本発明のもう1つの目的である。

【0034】雇用者が所有する移動局の従業員による私用を所有者が容易に制限できるようにすることが本発明のさらにもう1つの目的である。

【0035】雇用者が所有する移動局に関連するコストを最小限に抑えることが本発明のさらにもう1つの目的である。

【0036】

【発明の実施の形態】図1について、本発明を利用できる通信システムを一般的に10に示す。移動局12、14、16は移動交換局(MSC)18を介して互いに通信することができる。便宜上、移動局12、14、16

とMSC18との間に通信リンクを確立する基地局および基地局コントローラは図1から省かれている。移動局12, 14, 16は公衆交換電話網(PSTN)22を介して陸上回線局20と通信することもできる。

【0037】グループ呼出しサーバ(GCS)24がMSC18と連絡されている。GCS24は本質的に会議呼出しブリッジであり通信システム10内の多くのMSC18間の共用リソースとすることができる。

【0038】GCS24により移動局、陸上回線電話機、等のさまざまな終端装置間でグループ電話呼出しを行うことができる。グループ電話呼出しは本質的に少なくとも3人の加入者間の会議呼出しである。グループには陸上回線局、移動局、および/もしくはダイヤル可能な10桁番号を有しセルラー網および/もしくはPSTNを介してアクセス可能な任意のタイプの通信装置を含むことができる。GCS24は各グループ電話番号および特定グループ内の全構成員の個別の電話番号リストを含むグループ番号データベース(図示せず)を有している。

【0039】特定グループが移動局12, 14, 16、陸上回線局20および発信局26をその構成員として含むものとする。発信局26は基地局(図示せず)を介してMSC18と連絡された移動局、もしくはPSTN(図示せず)を介してMSC18と連絡された陸上回線局とすることができる。発信局26がグループ電話番号をダイヤルすることによりグループを呼び出すと、グループ電話番号がMSC18へ送られる。GCS24はMSC18からグループ電話番号を受信してそのデータベース内のグループのさまざまな番号を識別し、MSC18を介して各グループ構成員へ別々の呼を発生する。次に、MSC18は各端末ユニット(terminal unit)、すなわち、移動局12, 14, 16および陸上回線局20へ別々の呼出しを送る。各端末ユニットへの呼出しが接続されると、GCS24は会議呼出しブリッジへの音声経路を含むことになる。

【0040】図2に本発明による移動局を28に示す。移動局28はアンテナ34を介して情報信号32を送受信するトランシーバ30、ユーザによる呼出しを開始する呼び出しエータ36、どの発呼を送信できるかを決定する発呼プログラム38、発呼プログラム38に回答して特定の発呼が禁止されることをユーザに知らせる呼禁止インジケータ40、移動局28によりどの呼を受信できるかを決定する受呼プログラム42、受呼プログラム42に回答して移動局28がある着呼を受け入れられるようにするアクセプタ44、およびアクセプタ44に回答して着呼を有することをユーザに知らせる呼インジケータ46を含んでいる。前記した全要素の動作がプロセッサ48により制御される。

【0041】また、移動局28はそれを至急ラジオと同様に利用できるようにするプッシュトーク(PTT)ボ

タン50も含むことができる。例えば、PTTボタン50を押下すると送信が行われ、移動局28のマイクロフォン(図示せず)の音が強められてスピーカ(図示せず)の音が弱められ、ユーザは音声信号を送ることができる。PTTボタン50を解放すると、マイクロフォンの音が弱められてスピーカの音が強められユーザは着信音声信号を聞くことができる。

【0042】移動局28はやはりプロセッサ48により制御されるメモリ52も含んでいる。メモリ52はユーザが電話番号およびそれに関連するアルファニューメリックタグ(アルファタグ)(例えば、名称)をプログラムすることができる電話帳として利用される記憶エリアである。好ましくは、メモリ52は移動局28のパワーアップおよびパワーダウンに耐える非揮発性メモリである。

【0043】図3にメモリ52の構造を示す。メモリ52はメモリ位置識別番号を格納する第1のエリア54を含んでいる。第2のエリア56は電話番号を格納する。図3に示すように、第1の25メモリ位置、すなわち、グループメモリエリア58がグループ電話番号に割り当てられており、残りのメモリ位置(26~130)が従来の電話番号に利用されるが、本発明に他の割当て方式を使用することもできる。第3のエリア60は各電話番号に関連するアルファタグを格納する。アルファタグは特定の電話番号を容易に識別するために一般的にユーザにより設定されるアルファニューメリック文字の記号列である。第4のエリア62は各グループ電話番号に対するローム発信イネーブルフラグ(ROEF)を格納する。ROEFは2つの状態“0”および“1”を有する2進ビットとすることができる。ROEFが状態“1”であれば、ローム発信がイネーブルされ移動局28はローミングしながらその特定のグループ電話番号へのグループ呼出しを行うことができる。ROEFが状態“0”であれば、移動局28はローミングしながらその特定のグループ電話番号へのグループ呼出しを行うことができない。

【0044】メモリ52内の第5のエリア64は各グループ電話番号に対するローム受信イネーブルフラグ(RREF)を格納する。RREFも2つの状態“0”および“1”を有する2進ビットとすることができる。RREFが状態“1”であれば、ローム受信がイネーブルされ移動局28はローミングしながらその特定のグループ電話番号からのグループ呼出しを受け入れることができる。RREFが状態“0”であれば、ローム発信がディスエーブルされ移動局28はローミングしながらその特定のグループ電話番号からのグループ呼出しを受信することができない。もちろん、ROEFおよびRREFのイネーブルおよびディスエーブル状態は逆にすることができる。

【0045】メモリ52はダイヤルロック66および受

信ロック68も格納することができる。ダイヤル66および受信68ロックは移動局28の使用をさらに制御するために選択的に設定することができる。

【0046】ダイヤルロック66は呼を発信、もしくはダイヤルアウト、する移動局28の能力を制限する。移動局28のダイヤルロック66における発信を制限するためにさまざまな選択を始動させることができ、制約はしないが、それには下記のものが含まれる。

(a) 全てを許可する(どんな番号でもダイヤルできる)、(b) 全てを制限する(いかなる番号もダイヤルできない)、(c) 市内+800#(したがって、ローミング呼出しを制限する)、(d) メモリのみ、(e) 市内+800#+メモリのみ、(f) 国際呼出しを制限する、(g) 900#呼出しを制限する、(h) オペレータ呼出しを制限する、(i) グループのみ(ROEF=1のグループメモリエリア58[図3の位置1-25]からしか呼を発信できない)。

【0047】受信ロック68は着呼を受信する移動局28の能力を制御する。移動局28が選択的にある呼しか受信できないようにするために受信ロック68においてさまざまな選択を始動させることができ、制約はしないが、それには下記のものが含まれる。

(a) 全てを許可する  
(b) 全てを禁止する、(c) メモリのみ(ページングメッセージ内の発呼者回線IDがいずれかのメモリ位置に格納された電話番号と一致する呼しか受け入れられない)、(d) グループのみ(ページングメッセージ内の発呼者回線IDがRREF=1を有するグループ電話番号と一致する呼しか受け入れられない)。

【0048】発呼者回線ID特徴はセルラー電話機ユーザもしくは陸上回線電話機ユーザに対して着呼を発信した発呼者回線IDアタッチメント装置を有するかどうかを識別する既知の特徴である。呼が向けられるユーザは発呼者の電話番号、もしくは特定のグループ向け呼出しの場合はグループ電話番号、を含み着呼のページメッセージ内の定められたユーザへ送られる発呼者回線IDフィールドを介して呼発信者のアイデンティティを知る。

【0049】ROEFおよびRREFは移動局28がローミング状態である時しか作用しないことがお判りであろう。ローミングは本質的に移動局28がそのホームシステムの外部にあることを意味する。ローミングの概念を図4に示す。

【0050】図4は別々のワイヤレス通信システム、すなわち、セルラーシステム70、72、74、76を示す。各システム70、72、74、76は異なる地理的エリアをサービスし、したがって、異なる地理的境界を含んでいる。移動局が特定の通信システムの地理的境界内にある時は、その特定の通信システムを使用してその呼を送受信する。

【0051】どのようにローミングが生じるかを示すために、移動局28はそのホームシステムとしてシステム70を有する、すなわち、移動局28のユーザは通信システム70と取引しているものとする。移動局28はシステム70の地理的境界の外側を移動する時は、ローミングしているとみなされる。すなわち、移動局28は位置Aへ移動するとシステム72内をローミングしており、位置Bへ移動するとシステム74内をローミングしており、同様に、位置Cへ移動するとシステム76内をローミングしている。

【0052】図2に戻って、移動局28はNAM(番号割当てモジュール)情報を格納するためのNAM記憶エリア78を含んでいる。NAM情報は端末、すなわち移動局、をネットワークすなわちシステム内で動作するように構成する。NAM情報は移動局28がユーザーインターフェイスを介してどのように動作するかには関係しない。

【0053】移動局28にはNAM情報が移動する情報ハイウェイと考えることができるR-D a t aトランスポートネットワークを介してNAM情報を空中伝搬により受信する能力がある。空中伝搬により伝送されるNAM情報メッセージはそれをOAA(空中伝搬始動)メッセージとして識別するデータストリームの始のヘッダー内の情報要素によりSMS(ショートメッセージサービス)とは異なっている。移動局28はヘッダー内の情報要素を調べて着信情報をSMSもしくはOAAとして識別し、データを適切に処理する。

【0054】本発明による移動局28には信号80を介して空中伝搬によりユーザデータ、すなわち探択、情報を受信する能力もある。好ましくは、このユーザデータ情報も既設のR-D a t aトランスポートネットワークを介して伝送され、さまざまな電話番号(グループおよび標準)および図3に関して前記したダイヤルおよび受信ロック情報からなっている。したがって、R-D a t aトランスポートネットワークを介して信号80を受信する場合、NAM記憶エリア78へのアクセスを有しプロセッサ48により制御される移動局28内のユーザ探択プログラム82により、信号80がNAM情報を含むかユーザデータ情報を含むかが確認されそれに従って信号80(その中のデータ)が処理される。

【0055】ユーザ探択プログラム82の動作について検討する前に、R-D a t aトランスポートネットワークを介してのユーザデータ情報の発生および伝送について検討する。

【0056】R-D a t aトランスポートネットワークを介してユーザデータ情報を発生して伝送するシステムを図5に一般的に84で示す。基本的な前提は移動局28から遠隔の個人が移動局28の使用を構成もしくは制限したいということである。例えば、従業員にセルラー電話機を提供する会社は従業員によるそのセルラー電話

機の使用を制限したいことがある。会社は特定の電話機がある呼（グループ呼や標準呼）しか発信もしくは受信できないように制限したり、また／あるいは前記したように各電話機に異なるダイヤルおよび受信ロック特徴を設定したいことがある。本発明により、各従業員が自分のセルラー電話機を会社もしくはサービスプロバイダのサービスショップへ持ち込んで再構成するのではなく、会社がこのユーザ採択情報を空中伝搬により特定の各セルラー電話機へダウンロードして本質的にその移動局の使用を制御することができる。

【0057】好ましい形式では、インターネットブラウザアプリケーション86が移動局28から遠隔のコンピュータ（図示せず）内に含まれる。おそらく、コンピュータは会社の構内に配置される。インターネットブラウザアプリケーション86はインターネット88を介したGCS24へのリンクを有し、GCS24データベースの中を調べてその中に格納されたさまざまなグループおよび各グループの構成員を調べることができ、雇用者がGCS24データベースへアクセスしてグループを追加／削除しかつ／もしくはグループ内の構成員を追加／削除できるようにする。GCS24データベースを修正した後で、修正情報はメッセージセンター90、MSC18、基地局92、および空中信号80を介して関連する移動局28へ通される。

【0058】例えば、グループAが構成員a, b, c, dを含むものとする。雇用者がグループA内にさらに構成員e, fを含めたい場合、雇用者はインターネットブラウザアプリケーション86およびインターネット88を介してGCS24へアクセスし、構成員e, fの電話番号をグループAに追加することにより構成員e, fをグループAに含めるようにGCS24データベースを再構成する。したがって、その後構成員“a”がグループAへ呼出しを開始すると、GCS24は構成員b, c, d, e, fへページメッセージを送る。

【0059】また、雇用者はこの変更をメッセージセンター90へ知らせ、メッセージセンター90はR-Dat aトランスポートネットワークを使用して構成員e, fへそれらの移動局28のメモリ52内にグループAを含めるのに十分なグループ情報を含む信号80（その詳細については後述する）をMSC18および基地局92を介して送る。恐らく構成員a, b, c, dはそれらの各移動局のメモリ内にグループAに対する電話番号その他の関連情報を既に格納しているため、ならん信号を受信する必要がないことがお判りであろう。

【0060】もう1つの例として、グループBは構成員x, y, zを含むものとする。さらに、雇用者は構成員w, x, yしか含まないようにグループBを修正したいものとする。雇用者はインターネットブラウザアプリケーション86およびインターネット88を介してGCS24へアクセスし、構成員wの電話番号をグループBに

付加し構成員zの電話番号をグループBから削除することによりグループBを修正する。この修正もインターネットブラウザアプリケーション86からメッセージセンター90へ送られ、前記したようにそこから構成員w, zへ適切な信号が送られる。構成員wは自分をグループB内に含めるのに十分なグループ情報を受信し、構成員zはそのメモリから削除されたグループBに関する全ての情報を有する。

【0061】標準電話番号、関連するアルファタグ、ダイヤルロック66および受信ロック68を含むメモリ52内に格納される他のユーザ採択情報（図3）の修正は前記したように行われ、唯一の違いは他の情報がグループ関係ではないためGCS24にアクセスする必要がないことである。

【0062】R-Dat aトランスポートネットワーク両端間でメッセージセンター90により移動局28へ送られるユーザデータ情報を含む信号80の構造を図6に示す。（信号80は移動局28で受信されプロセッサ48を介してユーザ採択プログラム82へ送られる）。信号80は一般的にヘッダーフィールド94（1バイト）、グループメモリ割当てフィールド96（1バイト）、送信グループ位置98に対する番号フィールド（1バイト）、送信グループ情報100（20バイト／グループ）、送信標準位置102に対する番号フィールド（1バイト）、送信標準情報104（19バイト／標準位置）、受信ロックフィールド106（1バイト）およびダイヤルロックフィールド108（1バイト）を含むいくつかの変長データフィールドを含んでいる。前記フィールドは全てユーザインターフェイスを介して作動する移動局28を構成するユーザデータ情報を含んでいる。各フィールドに対する前記したバイト長は例にすぎず、他のビット／バイトフィールド長が考えられる。

【0063】次に、図2, 3, 6および7についてユーザ採択プログラム82の動作について説明する。信号80を受信すると（ブロック110）ユーザ採択プログラム82はヘッダー情報94を解析して信号80がユーザデータ情報を含むかどうかを確認する（ブロック112）。ユーザ採択プログラム82がヘッダー情報94から信号80はNAM情報信号であることを確認すると、信号はNAM記憶エリア78へ送られて（ブロック114）処理される。

【0064】ブロック112において信号80がユーザデータ情報を含むことをヘッダー94が示す場合には、グループメモリ割当てフィールド96が解析されて追加グループ電話番号に対して追加グループメモリエリア58を割り当てるべきかどうかを確認される（ブロック116）。グループメモリ割当てフィールド96内で0以外の値が見つかる場合には（図3に示す例では、メモリ52内に130のメモリ位置が含まれるためこの値も130より大きくはない）、ユーザ採択プログラム82は

その多量のメモリをグループ情報へ向けて割り当てる（ブロック118）。例えば、グループメモリ割当てフィールド96が番号30を含む場合、ユーザ探採プログラム82はブロック118においてグループ情報に対してさらに5つのメモリ位置を割り当てて、グループメモリ位置の総数を30とする。必ずしも1対1の対応ではないが、グループメモリへ向けた割当ては標準メモリ位置から行われることをお判り願いたい。

【0065】前記した再割当て後のメモリ52の典型的な割当て構造を図8に示す。グループメモリエリア58'は30グループメモリ位置に増加しているが、メモリ位置の総数は127へ減少しており（グループ番号がさらにメモリを必要とするため）、標準メモリ位置は減少することがお判りであろう。

【0066】ブロック116においてグループメモリ割当てフィールド96内に0が見つかる場合、それは現在のグループメモリ割当てが完璧であることを示し、ユーザ探採プログラム82はブロック120へ進んで送信グループ位置フィールド98内の情報を解析することによりなんらかのグループ情報が送信されているかどうかを確認する。例えば、フィールド98内に2が見つかる場合には、ユーザ探採プログラム82は2つのグループに関連する情報が信号内に含まれていることを知る。一般的にグループ当たり20バイトの情報が割り当てられるため、ユーザ探採プログラム82は送信される第1のグループに関連する情報に対しては次の20バイトを調べ、送信される第2のグループに関連する情報に対しては次の20バイトを調べることを知っている（ブロック122）。図3に示すように、グループ情報は位置番号54、グループ電話番号56、アルファタグ60、ROEF62、およびRREF64からなっている。

【0067】ブロック122においてグループ情報が変更された後で、すなわちブロック120においていかなるグループも送信されていないことが確認されると（フィールド98において0が見つかった）、ユーザ探採プログラム82はブロック124においてフィールド102を解析することによりなんらかの標準メモリ位置が送信されているかどうかを確認する。フィールド102内に0以外の値が見つかる場合には、ユーザ探採プログラム82はある数の標準メモリ位置に関連する情報が送信されていることを知りブロック126へ進む。例えば、フィールド102内に5が送信される場合、ユーザ探採プログラム82は5つの標準メモリ位置に関連する情報が送信されていることを知る。一般的に各標準メモリ位置に対して19バイトが割り当てられるため、ユーザ探採プログラム82はブロック126において送信標準メモリ位置に関連する情報について次の95バイト（5×19）を調べることを知っている。標準情報は位置番号54、標準電話番号56およびアルファタグ60からなっている。

【0068】ブロック126においてユーザ探採プログラム82が標準情報を変更した後で、すなわちブロック124においていかなる標準メモリ位置も送信されていないことが確認されると（フィールド102において0が見つかった）、ユーザ探採プログラム82はブロック128において受信フィールド106を解析する。

【0069】ブロック128において受信ロック選択を修正すべきことが確認されると、ユーザ探採プログラム82はブロック130へ進んで受信ロック68内に適切な選択を設定する。完了後、すなわちブロック128において修正不要であることが確認されると（受信ロックフィールド106内に0が見つかる）、ユーザ探採プログラムはブロック132においてダイヤルロック選択フィールド108を解析する。

【0070】ブロック132においてダイヤルロック選択を修正すべきことが確認されると、ユーザ探採プログラム82はブロック134へ進んでダイヤルロック66内に適切な選択を設定する。完了後、すなわちブロック132において修正不要であることが確認されると（ダイヤルロックフィールド108内に0が見つかる）、ユーザ探採プログラム82が終了する（ブロック136）。

【0071】前記した例におけるバイト割当ては単なる代表例にすぎず、本発明の精神および範囲内で信号80の特定の構成を再構成することができる。

【0072】さらに、移動局28にはメモリ52内に含まれるいかなる情報も変更できないうちに入力しなければならないセキュリティコードが一般的に設けられることをお判り願いたい。従業員が自分達の移動局を私用のために再構成することがないように、このセキュリティコードは従業員には開示されない。信号80がユーザ探採情報を含むことを感知すると、ユーザ探採プログラム82はセキュリティコードをバイパスもしくは真似て、メモリ52内のユーザ探採情報が信号80内の送信情報に従って変更されるようにすることができる。

【0073】本発明は所有者にその移動局の改善された使用制御を提供する。所有者は移動局をサービスショップへ物理的に持ち込んだりさらに／もしくはサービスプロバイダーからの応答を必要とすることなくその移動局を使用するように構成かつ再構成することができる。それは従業員に移動局を提供している雇用者であって、従業員がこの特権を乱用して雇用者の移動局を私用に使いすぎている雇用者にとって特に有用である。雇用者は、自分の都合で、選択した移動局をある番号の呼出ししか受信および／もしくは送信できないように容易かつ迅速に構成することができ、またその全てを従業員が電話機をサービスショップへ物理的に持ち込んで再構成させることなく行うことができる。したがって、雇用者はこのような移動局に関連するそのコストを最小限に抑えることができる。

【0074】図面を詳細に参照して本発明を説明してきたが、本発明の精神および範囲を逸脱することなくさまざまな修正を行えることをご理解願いたい。

【図面の簡単な説明】

【図1】本発明を利用できる標準通信システムのブロック図。

【図2】本発明の移動局のブロック図。

【図3】図2に示すメモリの拡大図。

【図4】4つの別々のワイヤレス通信システムおよび別々のシステム内の移動局のローミングを示す図。

【図5】R-D a t aトランスポートネットワークの両端間で移動局へユーザデータ情報を発生して送信するシステムのブロック図。

【図6】図5に示すシステムにより送信されるユーザデータ情報を含む信号の典型的な構造を示す図。

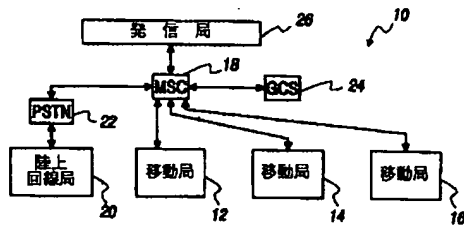
【図7】図2に示す移動局によるユーザデータ情報を含む信号の受信および処理を示すフロー図。

【図8】移動局メモリの修正バージョンの拡大図。

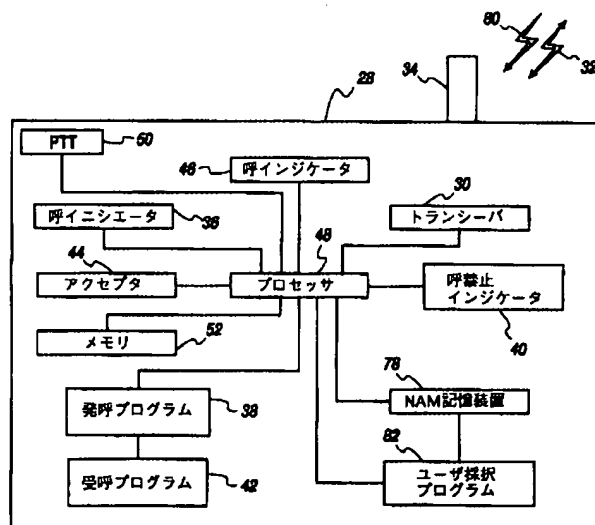
【符号の説明】

- |                |            |                |                        |
|----------------|------------|----------------|------------------------|
| 10             | 通信システム     | 32, 80         | 通信信号                   |
| 12, 14, 16, 28 | 移動局        | 34             | アンテナ                   |
| 18             | 移動交換局      | 36             | 呼イニシエータ                |
| 20             | 陸上回線局      | 38             | 発呼プログラム                |
| 22             | 公衆交換電話網    | 40             | 呼禁止イニシエータ              |
| 24             | グループ呼出しサーバ | 42             | 受呼プログラム                |
| 26             | 発信局        | 44             | アクセプタ                  |
| 30             | トランシーバ     | 46             | 呼表示器                   |
|                |            | 48             | プロセッサ                  |
|                |            | 50             | プッシュトークボタン             |
|                |            | 52             | メモリ                    |
|                |            | 54             | 第1のエリア                 |
|                |            | 56             | 第2のエリア                 |
|                |            | 58             | グループメモリエリア             |
|                |            | 60             | 第3のエリア                 |
|                |            | 62             | 第4のエリア                 |
|                |            | 64             | 第5のエリア                 |
|                |            | 66             | ダイヤルロック                |
|                |            | 68             | 受信ロック                  |
|                |            | 70, 72, 74, 76 | セルラーシステム               |
|                |            | 78             | NAM記憶エリア               |
|                |            | 82             | ユーザ採択プログラム             |
|                |            | 84             | R-D a t aトランスポートネットワーク |
|                |            | 86             | インターネットブラウザアプリケーション    |
|                |            | 88             | インターネット                |
|                |            | 90             | メッセージセンター              |
|                |            | 92             | 基地局                    |

【図1】



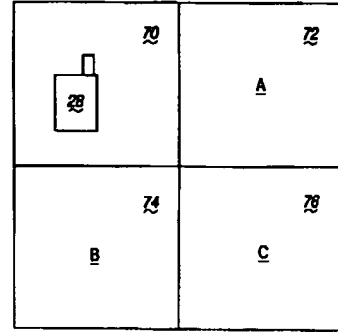
【図2】



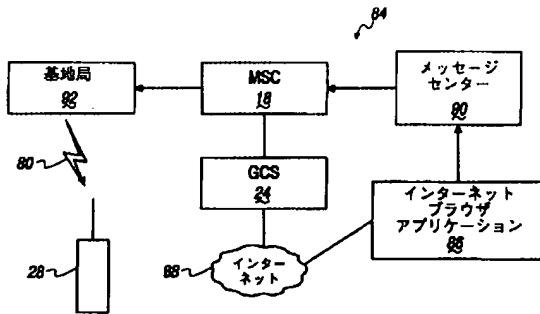
【図3】

1	グループ番号 1	アルファタグ 1	ROEF-1	RREF-1
2	グループ番号 2	アルファタグ 2	ROEF-2	RREF-2
3	グループ番号 3	アルファタグ 3	ROEF-3	RREF-3
⋮	⋮	⋮	⋮	⋮
25	グループ番号 25	アルファタグ 25	ROEF-25	RREF-25
26	電話番号 26	アルファタグ 26		
27	電話番号 27	アルファタグ 27		
⋮	⋮	⋮		
130	電話番号 130	アルファタグ 130		
	ダイヤルロック	受信ロック		

【図4】



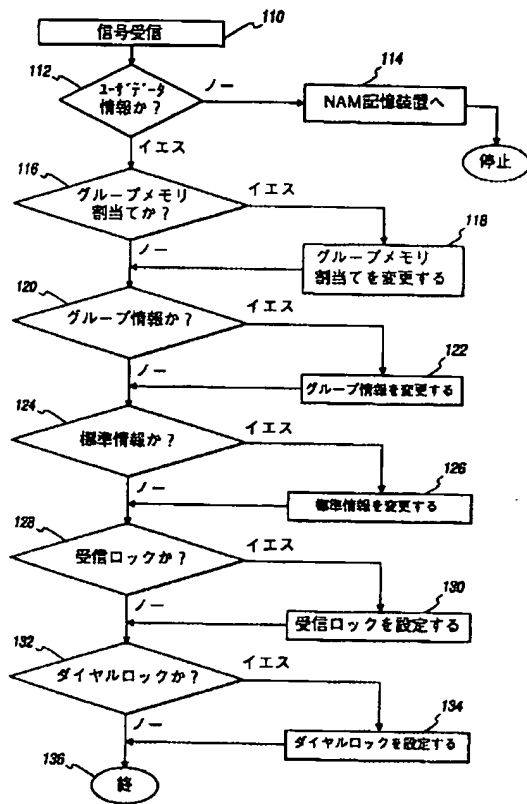
【図5】



【図6】

94	96	98	100	102	104	106	108
R-DATA ヘッダー 情報	グループ メモリ 割当	送信 グループ 位置番号	グループ1 位置番号 電話番号 アルファタグ ローミング中 送受信フラグ	送信標準 メモリ 位置番号	標準メモリ1 位置番号 電話番号 アルファタグ	受信 ロック 選択	ダイヤル ロック 選択

【図7】



【図8】

1	グループ番号 1	アルファタグ 1	ROEF - 1	RREF - 1
2	グループ番号 2	アルファタグ 2	ROEF - 2	RREF - 2
3	グループ番号 3	アルファタグ 3	ROEF - 3	RREF - 3
	⋮	⋮	⋮	⋮
29	グループ番号 29	アルファタグ 29	ROEF - 29	RREF - 29
30	グループ番号 30	アルファタグ 30	ROEF - 30	RREF - 30
31	電話番号 31	アルファタグ 31		
32	電話番号 32	アルファタグ 32		
	⋮	⋮		
126	電話番号 126	アルファタグ 126		
127	電話番号 127	アルファタグ 127		
	ダイヤルロック	受信ロック		



AP

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 01/05738

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04M1/725 H04M1/66 H04M1/2745 H04Q7/32

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04M H04Q

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

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

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 276 729 A (OTAKE ET AL) 4 January 1994 (1994-01-04) abstract	1-4,14
Y	column 2, line 44 -column 4, line 9 column 6, line 14 - line 34	14,16
Y	column 8, line 52 -column 9, line 9 column 10, line 66 -column 13, line 16	14,65,66
A	column 16, line 23 - line 40 figures 1,3	36,37,62
	--- -/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- \*&\* document member of the same patent family

Date of the actual completion of the international search

26 February 2002

Date of mailing of the international search report

05/03/2002

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Fragua, M

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 01/05738

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 742 666 A (ALPERT ) 21 April 1998 (1998-04-21) abstract	14,16
A	column 3, line 6 - line 50  column 5, line 8 -column 6, line 5 column 6, line 59 -column 7, line 34 column 8, line 42 - line 54 column 13, line 51 -column 14, line 48 figures 1-3,8	18, 20-22, 24,25, 27,28, 30, 36-40, 42,49,57
Y	US 5 940 752 A (HENRICK) 17 August 1999 (1999-08-17) abstract	14,65,66
A	column 2, line 9 - line 31 column 3, line 47 -column 4, line 34 column 5, line 25 -column 6, line 14 figures 1,2,5	1,3,64
X	US 5 802 460 A (PARVULESCU ET AL) 1 September 1998 (1998-09-01) abstract	1-3,14, 33
A	column 2, line 63 -column 3, line 53 column 5, line 35 -column 6, line 7 column 6, line 66 -column 8, line 36 figures 1,3A,3B,4-6	16
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A	EP 0 996 302 A (CIT ALCATEL) 26 April 2000 (2000-04-26) abstract column 2, line 1 - line 11 column 2, line 45 - line 52 column 3, line 10 - line 26 column 3, line 53 -column 4, line 3 column 5, line 2 - line 45 column 5, line 53 -column 6, line 42 figure 1	1-3,14, 64

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 01/05738

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 878 339 A (DION ET AL)                      2 March 1999 (1999-03-02)                      abstract                      column 2, line 44 -column 3, line 6                      column 4, line 11 - line 53                      column 5, line 1 - line 35                      column 6, line 15 -column 7, line 2                      column 10, line 61 -column 11, line 43                      figures 1,2</p> <p style="text-align: center;">---</p>	<p>1-3, 14,                      33</p>
A	<p>PATENT ABSTRACTS OF JAPAN                      vol. 2000, no. 07,                      29 September 2000 (2000-09-29)                      &amp; JP 2000 115859 A (ERICSSON INC),                      21 April 2000 (2000-04-21)                      abstract                      &amp; US 6 215 994 B1 (SCHMIDT ET AL)                      10 April 2001 (2001-04-10)                      abstract                      column 2, line 20 -column 4, line 45                      column 5, line 64 -column 6, line 11                      column 6, line 21 -column 7, line 38                      figures 1,2,7</p> <p style="text-align: center;">-----</p>	<p>1,2,14,                      15</p>

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International Application No  
PCT/EP 01/05738

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Information on patent family members

International Application No

PCT/EP 01/05738

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11,329,212</b>
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APPLICATION AS FILED – PART I			SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)				
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))				<b>150</b>		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))				<b>250</b>		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))				<b>100</b>		
TOTAL CLAIMS (37 CFR 1.16(i))	<b>20</b>	minus 20 =	X\$ 25		X\$50	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	<b>2</b>	minus 3 =	X\$100		X\$200	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			180		360	
			TOTAL	<b>500</b>	TOTAL	

\* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =		OR
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =		OR
Application Size Fee (37 CFR 1.16(s))								OR
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				180		360		OR
				TOTAL		TOTAL		OR
				ADD'T FEE		ADD'T FEE		

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =		OR
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =		OR
Application Size Fee (37 CFR 1.16(s))								OR
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				N/A		N/A		OR
				TOTAL		TOTAL		OR
				ADD'T FEE		ADD'T FEE		

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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