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Abstract:

The purpose of this paper is to list some telephony related applications and to describe them in more or less detailed manner, in order to share some technical ideas between field engineers and system developers, and to activate discussions between specialists involved in installing, servicing and distribution of telephony equipment. This paper is an attempt to determine which of the listed herein applications have an actual interest and/or a commercial potential in the field, and to attract attention of potential investors to the projects.

As well, this is to stimulate new ideas issuing by creative people who are kindly invited to meet eureka, either on or between these pages.

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Introduction

These days, the telephony encompasses many rapidly developing technologies, from traditional analogue voice transmission and switching techniques to powerful computerized telephone systems and communication channels. New wireless technologies have allowed the mobile communication to become possible for all of us. Telephony services are integrated into the data networks blurring the line between voice and data communications. Advanced computer and electronic technologies improve communication devices and systems, bringing us many new and useful functionalities and features.

Everything is very interesting and tempting, as on a technological revolution. Indeed, it is time to forget about our stomachs and just to think about a role in this technological tornado, swiftly carrying us away in the stormy future.

The purpose of this paper is to list some telephony related applications and to describe them in more or less detailed manner, in order to share some technical ideas between field engineers and system developers, and to activate discussions between specialists involved in installing, servicing and distribution of telephony equipment. This paper is an attempt to determine which of the listed herein applications have an actual interest and/or a commercial potential in the field, and to attract attention of potential investors to the projects.

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Applications

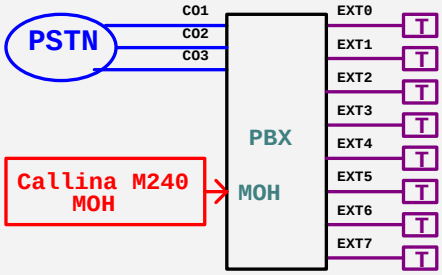
The presented here collection includes telephony applications basically for medium, small offices and home. Most of the projects have been developed and manufactured by different OEMs and are used already in many countries all over the world, while others have a less wide market or even being just as less or more interesting technical ideas.

A number of applications and projects intended for integration with PBX telephone systems are illustrated here. Those are call management and voice processing systems utilizing DSP and flash memory technologies, Door Phones, Intercoms and Access Control Systems. Such systems are often called as PBX peripherals, and they are basically implemented as standalone units or embedded in-system modules, to enable supplementary services and features of telephone systems.

A significant segment of telecom market is Small & Home Office (SOHO). There are small enterprises those wish to have full set of telephony services including Auto Attendant, Voice Mail, etc., without purchasing an expensive telephone system. Some applications for PBX-less offices are also described here.

A unit for device management (in limit of its user's data handling) of mobile handsets, and some applications utilizing cellular networks services, like unusual Intercoms, payphones, and Post Office Box (P.O.B.) notification system, bring up the collection.

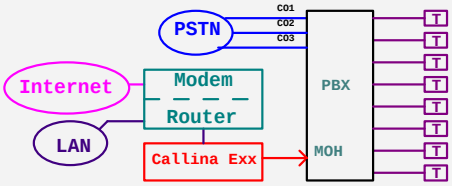
Ref. No.: TAC-0101
Ref. Name: Callina M240



Callina MT60/M240/M480 Music-On-Hold module is intended for usage in integration with PBX systems as a MOH source. This is a miniature digital voice recorder utilized flash memory technologies and adapted for the most known PBX systems.

Features:
MOH clip cycle duration 1/4/8 min
Balanced 600/8 ohm output
Embedded speaker
Simple and low cost

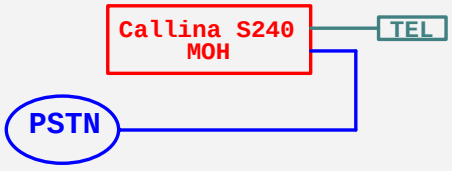
Ref. No.: TAC-0102
Ref. Name: Callina Exx



Callina Exx is a Music-On-Hold unit implementing a WEB based solution allowing remote up-down-loading of MOH clips via Intranet and Internet

Features:
Remotely configurable via Internet
Not required a fixed IP address from Internet Service Provider
Multiple MOH channels with possibility to mix different MOH clips

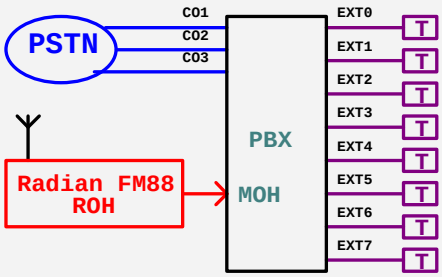
Ref. No.: TAC-0103
Ref. Name: Callina S240



Callina S240/S480 is a miniature Music-On-Hold unit intended for usage with conventional telephone set directly connected to PSTN. This is a miniature digital voice recorder utilized flash memory technologies and adapted for integration with CO line of PSTN.

Features:
MOH clip loop cycle duration 4/8 min
Adapted for CO line interface
Embedded speaker
Simple and low cost

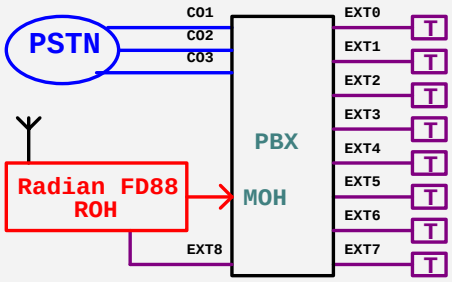
Ref. No.: TAC-0104
Ref. Name: Radian FM88



Radian FM64/FM88 is a miniature Radio-On-Hold module for PBX systems allowing receiving FM radio stations, and adapted for integration with the most known PBX systems.

Features:
FM bands covered by auto-tuning
Balanced 600/8 ohm output
Embedded speaker
Simple and low cost

Ref. No.: TAC-0105
Ref. Name: Radian FD88



Radian FD64/FD88 is a Radio-On-Hold module remotely controlled tuning feature, allowing selecting FM radio stations via telephone network by any conventional telephone set, and adapted for integration with the most known PBX systems.

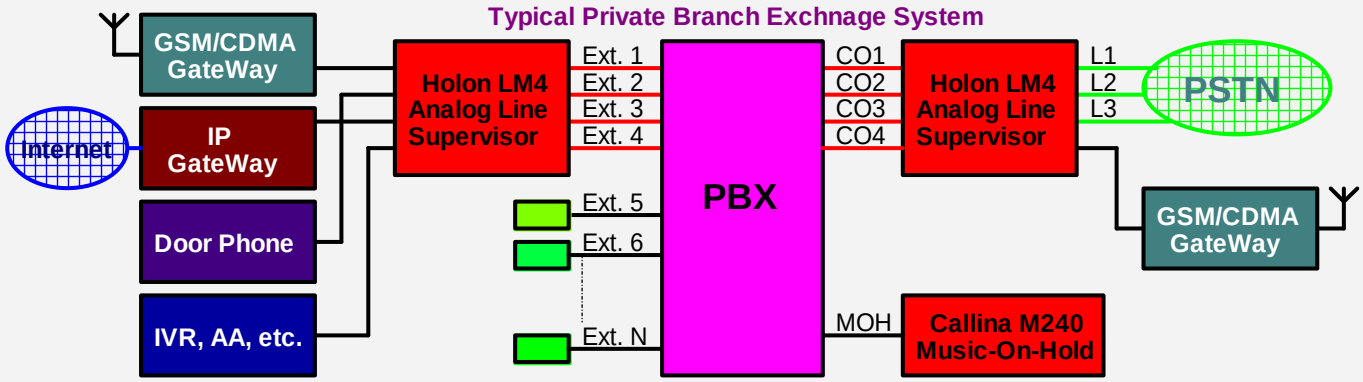
Features:
FM bands covered by auto-tuning controlled via telephone network
Balanced 600/8 ohm output
Embedded speaker

Ref. No.: TAC-0201
Ref. Name: Holon LMxx

Holon LM2/LM4/LM8/LM16 Line Monitoring Module (LMM or Line Supervising Module) is intended for integration with PBX/KTS systems and their peripherals like Cellular and IP Gateways, Automated Attendants, Auto Dialers, and Voice Mail Systems those cannot detect properly presence of specific Call Progress Tones (CPT, like BUSY, REORDER, etc.) on analogue CO/Ext lines.

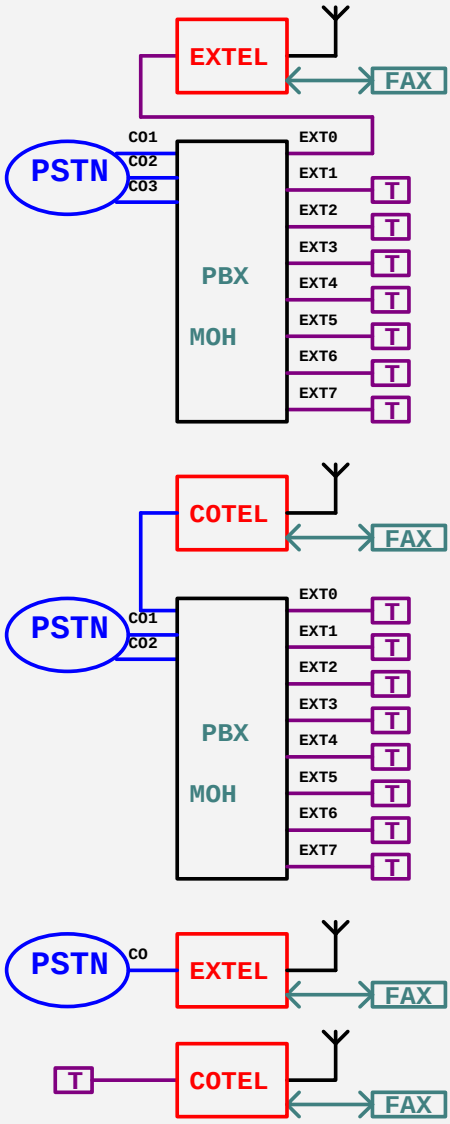
The module is capable to monitor analogue CO/Ext lines for Call Progress Tones, to analyze them by special algorithms comparing with pre-set CPT parameters, and to release hanged up line(s) if detected any.

Using of the module allows to
prevent CO/Ext lines blocking
make accurate logs and tariffs of call traffics on PBX systems
reduce ineffective calls receiving



Ref. No.: TAC-0300
Ref. Name: EXTEL

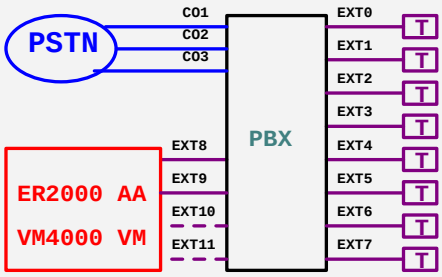
Ref. No.: TAC-0301
Ref. Name: COTEL



EXTEL & COTEL are Cellular Gateways to enable Least Cost Routing (LCR) function in integration with a PBX system. The Gateways can be connected to a telephone system via Extension or Central Office ports accordingly.

Features:
Compatible with GSM and CDMA cellular networks
DSP echo cancellation algorithms
Outgoing and incoming calls handling
Embedded Automatic Announcer/Attendant
SMS/Call initiated Callback
Incoming fax detection and automatic redirection to a fax machine
Speed, manual or mixed (with prefix) dialing
Password protected access from outside option
Caller ID capability allows to configure black and white lists for incoming calls and fax messages
Remotely configurable via PSTN
Configurable Call Progress Tone parameters
Multiple operation modes (Day/Night/Holyday)
Session time limiting capability

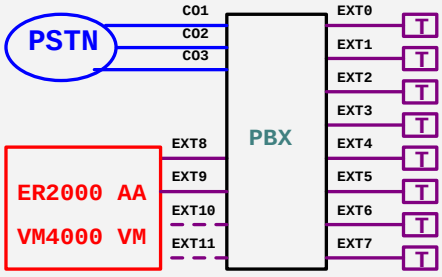
Ref. No.: TAC-0401
Ref. Name: Rahel ERx000



Rahel ER1000/ER2000/ER4000 is a line of Automatic Attendant units intended for integration with the most known PBX systems installed in small offices and allowing incoming calls automatic handling. The unit utilizes the latest DSP and FLASH memory technologies.

Features:
Integrated with PBX system via 1/2/4 analogue ports
16-90 min of total recording time used for voice greeting and voice menu messages
Remotely configurable and recorded via telephone network
Multimode (Day/Night/Holiday) operation
Fax tone detection and automation redirection modes
Additional features

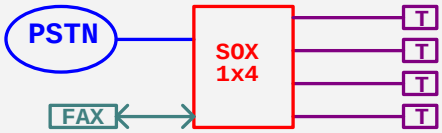
Ref. No.: TAC-0421
Ref. Name: Sharet VMx000



Sharet VM1000/VM2000/VM4000 is a line of Voice Mail units intended for integration with the most known PBX systems installed in small offices and allowing incoming calls automatic handling and processing of Voice Mail messages. The unit utilizes the latest DSP and FLASH memory technologies.

Features:
Integrated with PBX system via 1/2/4 analogue ports
32-420 min of total recording time used for voice greeting, menu and voice mail messages
Remotely configurable and recorded via telephone network
Multimode (Day/Night/Holiday) operation modes
Additional features

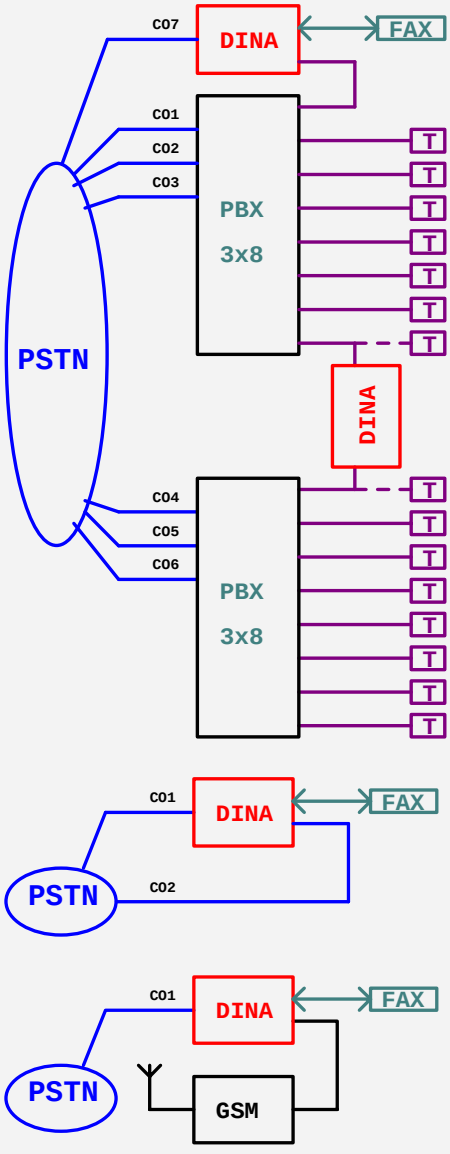
Ref. No.: TAC-0501
Ref. Name: SOX-4F



The SOX-4F Small Office eXchane System allows to share a CO line between four telephone sets and fax machine

Features:
Intercommunication between extension lines
Embedded Automatic Announcer and Music-On-Hold
Embedded Voice Mail with actual and virtual mail boxes
Incoming fax tone detection and redirection to a fax machine
Additional features

Ref. No.: TAC-0502
Ref. Name: DINA



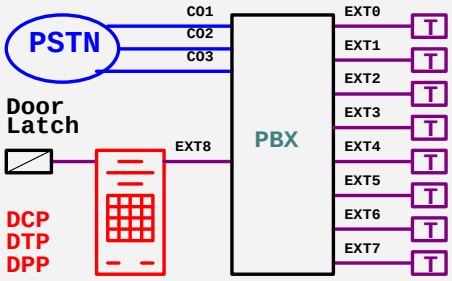
DINA - Direct Internal Numbers Access unit (as a derivative of DISA term) allows routing of incoming calls from an extra CO line to internal extensions of a PBX system, and outgoing calls from extensions of a PBX system to the extra CO, as well as direct redirection of calls from one CO line to another CO/GSM-CDMA Gateway for SOHO applications those do not use PBX systems. DINA may be useful in integration with PBX systems those do not have upgrade options to add additional CO lines (for example as Samsung SKP-308), or may be used as a bridge between PBX systems.

Features:
Outgoing and incoming calls handling
Embedded Automatic Announcer/Attendant
Incoming fax detection and automatic redirection to a fax machine
Speed, manual or mixed (with prefix) dialing
Password protected access from outside option
Caller ID capability allows to configure black and white lists for incoming calls and fax messages
Remotely configurable via PSTN
Multiple operation modes (Day/Night/Holyday)
Session time limiting capability

Ref. No.: TAC-0601
Ref. Name: DoorCodePhone

Ref. No.: TAC-0602
Ref. Name: DoorTelePhone

Ref. No.: TAC-0603
Ref. Name: DoorPanaPhone

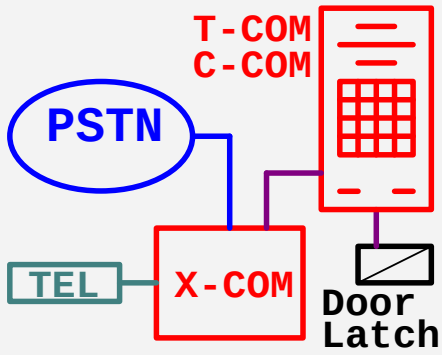


DCP, DTP are Door Phones intended for integration with the most known PBX systems via regular analogue extension, while DPP is a Door Code Phone intended for integration with Panasonic systems via special Panasonic Intercom Interface.

Features:
Speed and manual dialing (DTP – speed only)
Full-Duplex Speakerphone allows hands free operation
Door latch coded control via telephone network
Door latch coded control by keypad (DCP and DPP only)
Locally configurable by keypad
Remotely configurable via telephone network
Vandal and weather resistive options possible

Ref. No.: TAC-0610
Ref. Name: XT-COM

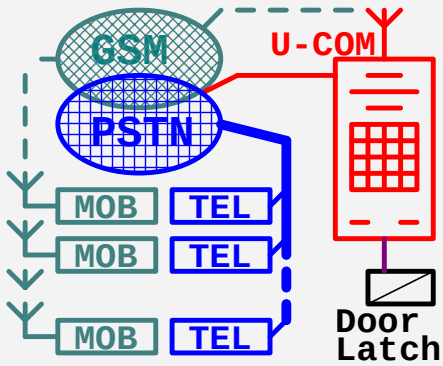
Ref. No.: TAC-0611
Ref. Name: XC-COM



T-COM & C-COM are Intercom Panels those can communicate with a conventional telephone set via XCOM switch that allows sharing the telephone set between PSTN and Intercom Panels. XC-COM & XT-COM are ideal intercom solutions for houses those are not equipped with PBX but with regular CO telephone line and set.

Features:
Half-Duplex Speakerphone allows hands free operation
Door latch coded control via telephone network
Door latch coded control by keypad (C-COM Panel only)
Configurable by a touchtone phone
Vandal and weather resistive options possible

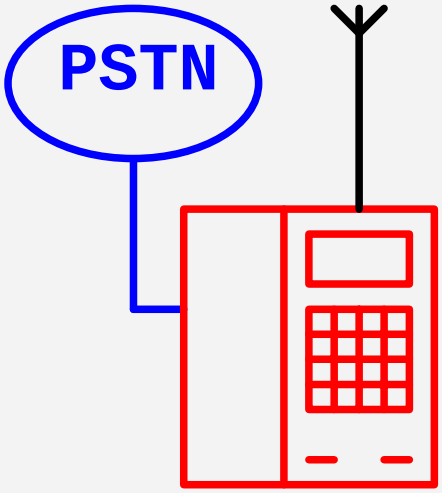
Ref. No.: TAC-0620
Ref. Name: U-COM



U-COM is a Universal Intercom Panel intended for multi-room buildings and for remote objects with common entry, where no cable system exists and cannot be built by some reason. The Panel utilizes PSTN/PBX and cellular networks for Intercommunication and for access control where telecom operators may offer a fixed and limited service fee.

Features:
Half-Duplex Speakerphone with echo-canceller allows hands free operation
Preprogrammed telephone numbers associated with objects
Door latch coded control via telephone networks
Door latch coded control by keypad of the Panel
Least Cost Routing (LCR)
Vandal and weather resistive options possible

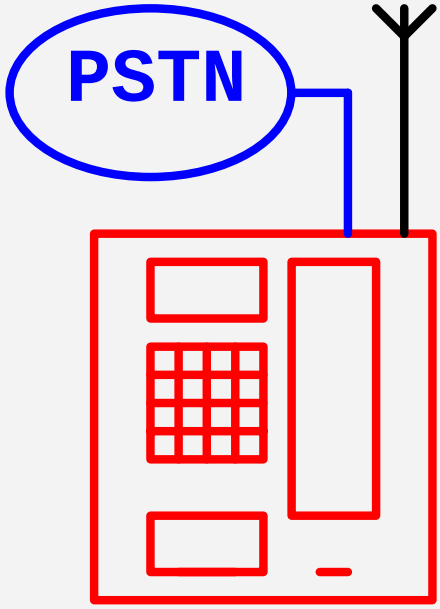
Ref. No.: TAC-0700
Ref. Name: DESKTEL



DESKTEL is a universal telephone set allowing voice intercommunication with different wireless operators and a conventional PSTN operator. The telephone set performs Least Cost Routing (LCR), and other useful functions. It is intended for small offices those do not use PBX, but initiate intensive telephone traffics via different telecom operators.

Features:
LCR function between one PSTN and two GSM operators
2 SIM cards of different operators handling
Embedded Music-On-Hold, Automatic Announcer and Voice Mail
Most of regular PBX functionalities as call forwarding, line holding, teleconference, “Out-Of-Office” function for incoming calls redirect to mobile handsets.
Real Time Clock allows time scheduled operation modes
External RF antenna may be placed remotely from operator/officer in a position with better RSSI value.
Speaker phone & echo canceller allows hands free operation
Configurable by keypad and remotely via PSTN
Powered by 220VAC/12VDC adapter with optional back-up battery

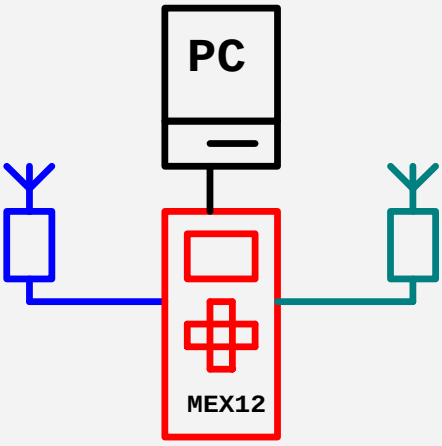
Ref. No.: TAC-0710
Ref. Name: PUBTEL



PUBTEL is a public phone with Least Cost Routing (LCR) function. This unit is intended mostly for telecom services distributors like owners of mini-markets, coffee shops, gas stations, etc., providing to their customers telephone calling facilities.

Features:
LCR function via one PSTN line and 2 GSM operators
2 SIM cards of different operators handling
Free Emergency Calls speed dialing
Anti-vandal metal or light plastic cabinets possible
Call duration counter with optional session time limiter
Real Time Clock allows time scheduled operation modes
Configurable by keypad and remotely via PSTN
Automatic LCD and keypad backlighting
Powered by 110/220VAC or 12VDC with optional back-up battery

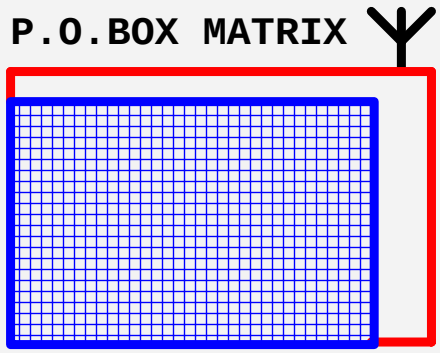
Ref. No.: TAC-0800
Ref. Name: MEX-12



MEX-12 is a cellular mobile phones memory exchanger allowing transferring of user data like phone books, ring tones and melodies between different handsets, or between a handset and PC. The unit is Intended for wireless operators and distributors of mobile handsets.

Features:
User data exchange between mobile phones in standalone mode
User data exchange between mobile phones and PC
SIM card user data handling
Handsets handling of different cellular technologies and operators
Firmware updating for supporting newer versions of mobile handsets by a PC utility via RS-232 serial interface

Ref. No.: TAC-0900
Ref. Name: POBTEL



This system is intended for integration with P.O.B. matrix at a Post Office. It allows scanning of post box matrix for presence of mail, and to notify each post box owner if there is any correspondence available in his box.

Features:
SMS notification to pre-defined mobile phone number(s)
Notification by e-mail
A box full/empty status password protected checking by sending SMS and receiving a status SMS back
A box full/empty status checking by calling to the unit and listening a box status voice note

Abbreviations and Terms Interpretation

AA	Automatic Answer – is a machine feature that allows a transmission control unit or telephone system to respond automatically to a call that it receives. Automatic Attendant – is a standalone unit integrated with, or a module embedded into a PBX telephone system, that automatically answers incoming calls, prompts a caller to navigate via voice menu(s), and prompts the caller to select a final call recipient to be routed to.
ADSL	Asymmetric Data Subscriber Line – is a technology for transmitting digital information at a high bandwidth on existing phone lines to homes and businesses. Unlike regular dialup phone service, ADSL provides continuously available, "always on" connection. ADSL is asymmetric in that it uses most of the channel to transmit downstream to the user and only a small part to receive information from the user. ADSL simultaneously accommodates analog (voice) information on the same line. ADSL is generally offered at downstream data rates from 512 Kbps to about 6 Mbps.
Announcement	Announcement Service – is a machine feature that allows playing back voice announcement messages to a caller, while his call is routed, being on hold, etc.
BGM	Back-Ground-Music – is a machine feature to provide background music to callers while a voice session is in progress. BGM has louder volume level than voice has.
CDMA	Code Division Multiple Access – is a digital wireless telephony transmission technique that allows multiple frequencies to be used simultaneously (Spread Spectrum).
CDPD	Cellular Digital Packet Data – is a open specification of technology used to transmit data in packets over cellular networks with rates of up to 19.2 Kbps.
CID	Caller ID – is a communication network service that enables a called party to identify a caller by his telephone number before answering.
CO	Central Office – is an office in a locality to which subscriber home and business lines are connected on what is called a Local Loop. The central office has switching equipment that can switch calls locally or to long-distance carrier phone offices. In some countries, the term "public exchange" is used instead of CO term.
CPT	Call Progress Tones – are periodical packets of a single or/and dual audible tones generated by switching equipment to inform a caller of a call progress and/or state of a voice session. The tones commonly are named as RING, RE-ORDER, BUSY, etc. Parameters of the CPT tone like tone frequency(s), duration of tone envelopes and duration of pauses between them typically differ in different countries and switching telephone equipment.
DISA	Direct Inward System Access – is a feature of PBX system to provide to an outside caller access to basic system features as initiating outgoing calls as well as calls to internal extensions, internal paging, etc. DISA module may also (but not must) provide a number of similar functions as Automatic Attendant does, however it is not the same unit as AA. Typically, DISA module limits access to all system features or some of their part with password in order to avoid unauthorized usage of PBX system from outside.
DINA	Direct Internal Number Access - is a standalone unit integrated with a PBX system that allows bi-directional bridging of an external CO line and internal extension lines and provides supplementary functions (Voice Menu Driven Call Routing, Voice Announcement) as Automated Attendant does. As well as CO-Ext, the unit may be used as CO-CO, Ext-Ext bridge.

DSP	Digital Signal Processor – is a special fast microprocessor that specialized to perform powerful mathematic calculations of digitized analogue signals in real-time. DSP is notable by such features as very fast instruction execution speed, wide processor registers and buses allowing parallel operations, pipelined parallel multiplier-accumulator, on-chip hardware stack and other commonly software realized modules implemented by hardware, and by other features. In telephony, DSP is commonly used for digital voice streams compressing/decompressing, for adaptive filtering, voice recognition algorithms implementing, etc.
DTMF	Dual Tone Multi Frequency – is a audible tone composed by mixing of two tones with different frequencies in order to encode each of 16 push buttons (0-9, *, #, A, B, C, D) of a telephone dialer keypad. DTMF tones are sequentially transmitted by a telephone set to a switch (either PBXs or central offices) while a number is dialed, and switching equipment decodes them in order to get a destination number to perform switching to. Also, DTMF tones are often used to navigate via voice menu at IVR systems, to perform a system/unit configuration, or just as an audible user notification, as well as for implementations of special signaling and data protocols like Ademco Contact ID and others.
FM	Frequency Modulation – is a RF carrier modulation method used for signal transmission where information about amplitude of the transmitted signal is coded by proportional frequency changes of the carrier
GSM	Global System for Mobile communications – is the most widely used digital mobile phone system that is one of the world's main 2G digital wireless standards. GSM is present in more than 160 countries and according to the GSM Association, accounts for approximately 70 percent of the total digital cellular wireless market. GSM is a time division multiplex (TDM) system. Implemented on 800, 900, 1800 and 1900 MHz frequency bands.
GPRS	General Packet Radio Service is a radio technology for GSM networks that adds packet-switching protocols, shorter set-up time for ISP connections, and offer the possibility to charge by amount of data sent rather than connect time. GPRS promises to support flexible data transmission rates typically up to 20 or 30 Kbps (with a theoretical maximum of 171.2 Kbps), as well as continuous connection to the network. A 2.5G enhancement to GSM, GPRS is the most significant step towards 3G, needing similar business model, and service and network architectures. GPRS started to appear in some networks during 2000.
IP Address	Internet Protocol Address - is a unique 32-bit number that identifies a computer on the Internet. This number is usually printed in decimal form (for example 192.168.0.1). All resources on the Internet must have an IP address -- else they're not on the Internet at all. Also, IP address is used in local IP based networks those may (or may not) have a gateway to the Internet. Local IP address have to be unique in limit of the local network as well, and it is not seen on the Internet.
IP Gateway	IP Gateway – is most commonly a network device that converts voice and fax calls, in real time, between the public switched telephone network (PSTN) and an IP network. Primary IP gateway functions include voice, fax, compression/decompression, packetization, call routing, and control signaling. Additional features may include interfaces to external controllers, such as gatekeepers or soft-switches, billing systems, and network management systems.
IP Telephony	IP Telephony – is a technology that allows voice phone calls to be made over the Internet or other packet networks
ISDN	Integrated Services Digital Network – is a set of CCITT/ITU standards for digital transmission over ordinary telephone copper wire as well as over other media. ISDN is generally available from a telecom operator in most urban areas in the United States and Europe. In many areas where DSL and Cable modem service are now offered, ISDN is no longer as a popular option as it was formerly.
IVR	Interactive Voice Response – is a system that allows a caller to access computer based information and possible to change that data or initiate requests. The most widely known IVR application is telephone banking. Sometimes, IVR term is also used to refer Automatic Attendant (AA), Audio-Text Information and Voice Mail (VM) systems.

KSU	Key Service Unit – is a small telephone system (see also PBX)
KTS	Key Telephone System – is a small telephone system (see also PBX)
LCR	Least Cost Routing – is a system feature that automatically forwards outgoing telephone calls to the telephone service that costs the least to that location at that time of day. Depending on how it is programmed, least cost routing will either drop down to the second most-efficient service if the first is not available, or it will give the caller a busy signal. LCR feature is widely used to avoid extra cost of operator-to-operator connections between fixed and wireless network operators.
LAN	Local Area Network – is a private communication network used to connect computers and other devices across a local area. Usually, term “local” means connection of computers in limits of an area without using any public networks or long distance communication channels.
Local Loop	Local Loop - is the wired connection from a telephone company's Central Office (CO) in a locality to its customers' telephones at homes and businesses. This connection is usually on a pair of copper wires called twisted pair. The system was originally designed for voice transmission only, using analogue transmission technology on a single voice channel. Today, with ISDN or DSL technologies, the Local Loop can carry digital data at a much higher bandwidth than they can do by usual voice modems.
MOH	Music-On-Hold – is a machine feature to provide music to a caller being placed on hold for example while call transferring. Usually, MOH feature is accommodated with Massaging-On-Hold task mixing music and information and/or advertise voice messages in the same clip.
PABX	Private Automatic Branch eXchage (see PBX) – is a derivative of PBX term that notes about automatic/computerized nature of switching instead of commutation by human assistant with a manual switchboard. Actually these days, PABX and PBX terms are used as equivalent.
PBX	Private Branch eXchage – is a subscriber owned switching telephone system that switches calls between users on local/internal lines, and that usually includes access to the public switched network (PSTN). The principal difference between PBX and KTS is minimized in recent years. Generally, KTS is smaller than PBX. KTS usually shares several analogue lines between users, while PBX may be connected to PSTN via multi-line trunks.
POTS	Plain Old Telephone Service – is a term sometimes used in discussion of new telephone technologies in which the question of whether and how existing voice transmission for ordinary phone communication can be accommodated. For example, Asymmetric Digital Subscriber Line (ADSL) and Integrated Services Digital Network (ISDN) connections provide some part of their channels for "plain old telephone service" while providing most of their bandwidth for digital data transmission.
PSTN	Public Switched Telephone Network – is the world's collection of interconnected voice-oriented public telephone networks, both commercial and government-owned. It's also referred to as the Plain Old Telephone Service (POTS). It's the aggregation of old and modern circuit-switching telephone networks. Today, it is almost entirely digital technologies except for the final link from the central (local) telephone office to the user.
ROH	Radio-On-Hold – is a machine feature to provide broadcasting radio stations to a caller being placed on hold for example while call transferring. Sometimes, ROH is used as an alternative or as an add-on to the Music-On-Hold (MOH) feature.
RF	Radio Frequency – is the range of the electromagnetic spectrum usually between 100 kHz and 3 GHz, used for wireless radio transmission of analogue (for example audio, video, etc.), and digital (for example digitized voice via GSM, data streams via GPRS/CDPD, etc.) signals. The whole of the range is divided by a number of frequency bands (RF waves sub-ranges), according to transmitted signals, methods of modulation, RF power, etc. The bands are used for Radio and TV broadcasting, communications, etc. in many civilian and military areas.

RSSI	Received Signal Strength Indication – is measured and indicated to user/operator power of received RF signal by a wireless device/system. For example, RSSI level is indicated on display of a mobile handset to inform its user about RF signal quality the area the user is located in.
SOHO	Small Office & Home Office – is a term usually used to refer home based and small businesses, offices as a market segment and to describe a type of working environment.
SMS	Short Message Service is available on digital GSM networks allowing text messages of up to 160 characters to be sent and received via the network operator's message center to/from a mobile phone, or from the Internet, using "SMS gateway" website.
TDMA	Time Division Multiple Access – is a digital wireless telephony transmission technique that allocates each user a different time slot on a given frequency. TDMA is used by GSM, D-AMPS, PDC and DECT in one form or another. Generally, TDMA term used for D-AMPS. TDMA networks operate in the US, Latin America, New Zealand, parts of Russia and Asia Pacific.
VM	Voice Mail – is a standalone unit integrated with, or a module embedded into a PBX telephone system, that automatically answers incoming calls, prompts a caller to navigate via voice menu(s), and prompts the caller to select a final call recipient to be routed to, with possibility to leave a voice message into Voice Mail Box of the call recipient if the call is not answered.
WAN	Wide Area Network – is a communications network used to connect computers and other devices across long distanced areas. The connection can be private or public.

