philtel

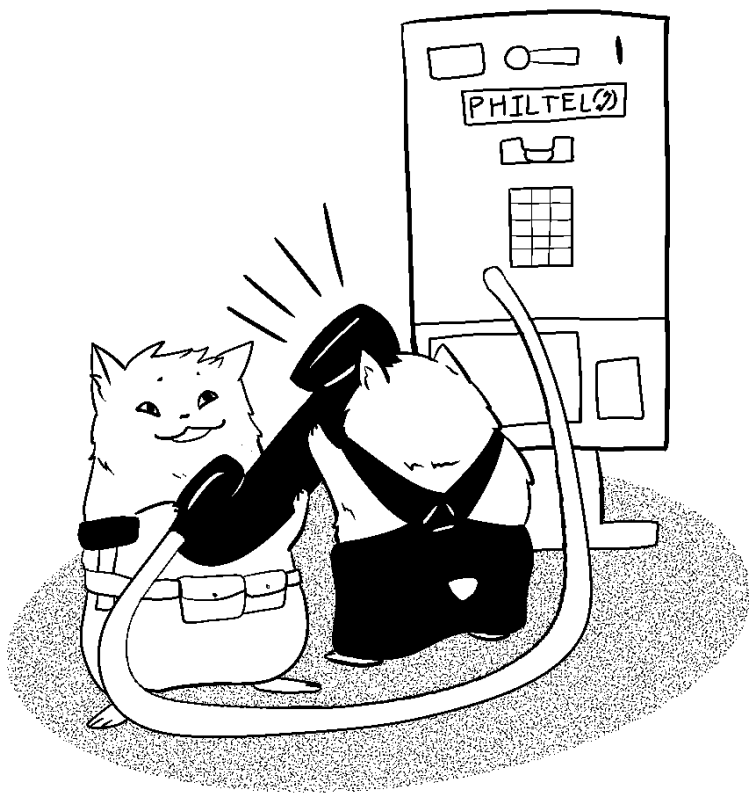**A PHREAKY PHONE COLLECTIVE**

Introduction

PhilTel is a telephone collective focused on installing free-to-use payphones within Philadelphia!

Before the advent of cellular phones, payphones could be readily found at street corners, restaurants, train stations, convenience stores, and all sorts of other places! Payphones, as Karl Anderson of Futel* once put it, are pieces of urban furniture. In an otherwise desolate urban landscape, people could escape to the warmth of the telephone dial tone and punch some numbers into a keypad to instantly connect with a human voice somewhere else in the world.

These days payphones are hard to find, if you can find them at all that is. Relegated to little-used hallways or claustrophobic back corners, payphones are generally kept out of sight and out of mind by the general public. At PhilTel, we want to work to bring payphones back to the forefront in an effort to increase access to people/telephone-mediated services through the preservation of public, free-to-use telephone infrastructure.

* See page 12.

How do I use a Payphone?

Using a payphone is simple, but if you have never used (or seen) one before, they can look like strange devices meant to be operated by somebody who knows what they're doing.

In reality, operating a payphone is incredibly easy, and our PhilTel payphones are even easier to operate as no money is needed!

Simply follow these steps:
1. Pick up the receiver
2. Wait for a dial tone
3. Dial 1 + area code + number for any domestic U.S. call

After a few seconds, your call should connect as expected and you should hear ringing. On the off-chance that you don't, hang up and try placing your call again. Operators are also standing by for assistance and can be reached by dialing "0" if you have trouble placing your call.

HOW TO TALK ON THE TELEPHONE

RECEIVER

When using the telephone, hold the receiver close to your ear. The receiver is the end without the cord.

Talk directly into the mouthpiece. This way.

Not this way.   Not this way.

Speak in a natural, clear voice.

You do not have to shout. Speak as though the other person were in the same room.

5

Who Can I Call With This?

All PhilTel phones are connected to the Public Switched Telephone Network (PSTN). This means that the phone can make calls to or receive calls from anyone with standard phone access, like you would get through your cellular phone or landline.

Think of the PSTN as something like the Internet, with many service providers criss-crossing connections to and through one another. Even though you may use a company like Verizon for your phone access and your friend may use AT&T, the system is designed to let communications flow seamlessly between users.
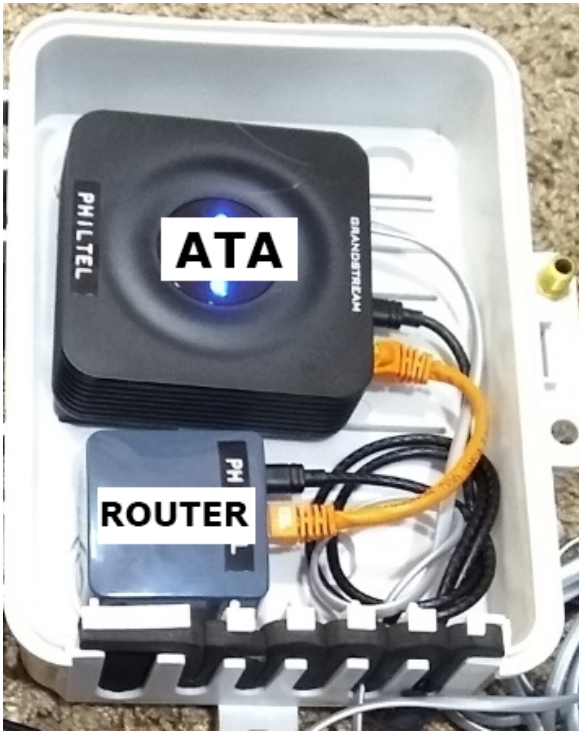
While PhilTel installs payphones, we do not charge callers any money to use the phones. In this day and age, communication is a necessity and access to the tools to facilitate it should be available to anyone who needs them.
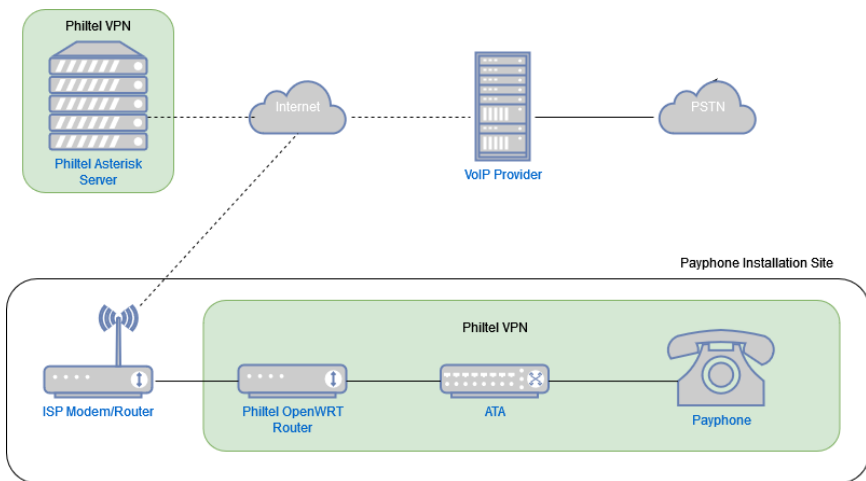
Hardware Overview

Want to know how the PhilTel network actually works?

To power the telephone network that drives the payphones, we are making use of commodity hardware (especially used/discarded and low-power-consumption hardware) and open-source software where available. The workhorse of our network is an Asterisk-based Public Branch eXchange (PBX) running on a virtual private server (VPS) on the Internet. Asterisk acts a bit like a bridge between the Public Switched Telephone Network (PSTN) and our collection of payphones; we can facilitate connections between the payphones and the outside world seamlessly. To connect to the PSTN, we get service through a Voice over Internet Protocol (VoIP) provider (think of them like an Internet Service Provider but for telephony). However, Asterisk is much more powerful than a simple traffic controller, and it lets us create our own services or connections to private telephone networks that any caller can access!

Each site where a payphone is installed will connect to our Asterisk server through two pieces of hardware: a GL.iNet GL-AR300M16 router and a Grandstream HT801 Analog Telephone Adapter (ATA). These devices connect to mains power (pulling less than 1A at 5V in total), though we hope to explore solar options in the future.

The router (similar to your Internet router at home) runs software called OpenWRT that allows for more robust features than typical router software and provides a consistent experience for the administrator configuring it (even if we were using many routers made by different brands). Another piece of software called OpenVPN is installed on both the router and our Asterisk server to provide an encrypted Virtual Private Network (VPN), so devices connected to the router can communicate with services on our server as though they were physically on the same network.
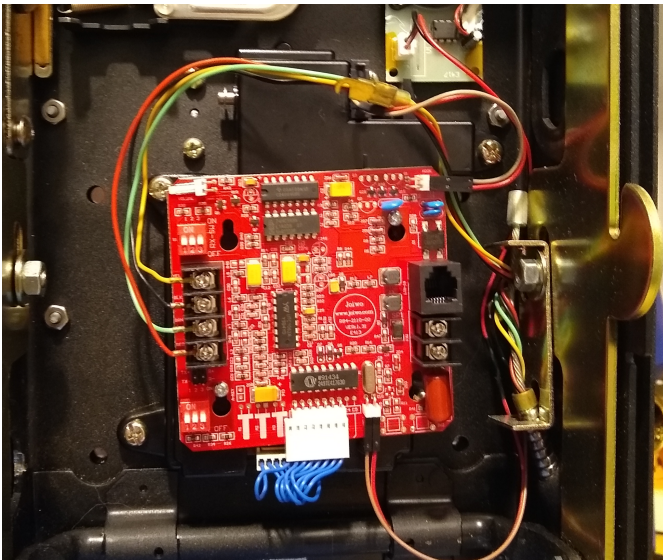
With the VPN, any bad actors using the same network as our phone at the installation site won't be able to listen in to Internet traffic related to a call being made. Further, PhilTel does not monitor who is using the phone or the contents of any call, though phone numbers may reside in our server logs until they are cycled out.

But how does the payphone, or any old phone with an RJ-11 jack for that matter, communicate with our Asterisk server? This is where the ATA comes in. The ATA has two jacks on it: one RJ-11 jack for a phone and one RJ-45 jack to connect to a router.

Essentially, the ATA acts as an analog-to-digital converter and helps our old payphone speak the popular Session Initiation Protocol (SIP), allowing Asterisk a way to send/receive calls to our payphone over the Internet! To the payphone, the ATA behaves just like the PSTN would, so everything works the same way it would if the phone were connected to a standard landline.
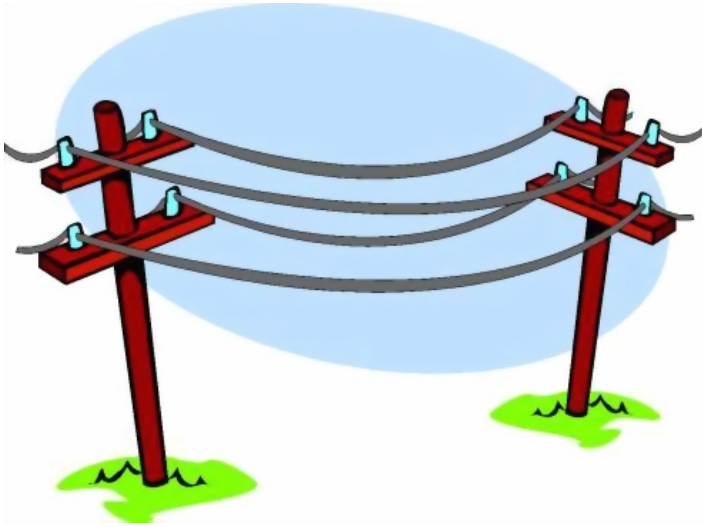
For now, PhilTel phones make use of a "coinless" circuit board that replaces the existing electronics in the phone that would determine how much to charge for calls and handle payments. The new circuit board has a much smaller footprint than the older board and mounts cleanly to the back of the phone's dialpad. In the future, we hope to repurpose the older phone electronics to reduce waste and still keep calls completely free!

Other Networks - PhreakNet

PhilTel is not just connected to the PSTN, but also to a network of hobbyist phone collectors called PhreakNet. If you think of the PSTN acting like an Internet of phones, PhreakNet is more like your home or office Local Area Network (LAN). Think about how at your home you may have many computers, tablets, printers, and smart devices that can communicate and connect to one another. It's easy to send a document to your printer or grab photos off the computer in your bedroom when you're sitting in the living room, but if you walk a couple blocks away to a coffee shop you may not be able to do any of these things because you have left your local network. PhreakNet works in a similar manner with hobbyists each running their telephone equipment on one big virtual LAN.

Back in the day, telephone companies would erect buildings called Central Offices to service distinct geographical areas. Telephone exchanges could only hold a certain number of customers, so it would not be uncommon to see a single exchange servicing a county or a dozen exchanges servicing a city depending on population density. Similar to this, each hobbyist joining PhreakNet creates their own exchange using software instead of physically constructing a building. Instead of one phone number on an exchange going to one household, PhreakNet users use these numbers to wire up individual phones, create test numbers, point to recordings, or interface with other telephone hardware.

Similar to your home LAN where computers and other devices can easily communicate information, exchanges also allow for interconnection so a phone on one exchange can easily call up a phone on another. Instead of running physical trunk lines between exchanges like the old North American phone network, PhreakNet leverages VoIP links to connect hobbyist-run exchanges virtually.

Further, just as your LAN devices are somewhat isolated from the Internet (and random people can't access services within your network unless you explicitly configure things this way), PhreakNet numbers are not directly accessible from the PSTN unless a gateway is dialed into first to gain access to the network.

For more information, check out
https://portal.phreaknet.org

Similar Projects - Futel

Futel is a Portland, Oregon-based phone company started in 2014 by Karl Anderson. Futel currently operates twelve free-to-use phones (both payphones and armored phones) within Oregon, Washington, and Michigan, including one at *Right 2 Dream Too*, a self-managed houseless encampment in Portland. For more information, visit https://futel.net

Similar Projects - Talk To Me

Talk To Me is a network of five public payphones located in each of the five boroughs of New York City, that only call each other. Participants who pick up a TTM receiver set the other four ringing, inviting passing New Yorkers to answer the call. Upon connection, two unsuspecting strangers are thrust into conversation and left to navigate a serendipitous interaction with their neighbor. Talk To Me was launched in June 2022 by Jordan Seiler. For more information visit http://talktomenyc.com

Phone Phreaking

PhilTel is phreaking friendly, meaning we encourage users to both experiment with and explore the telephone network. Phone phreaking started in the 1950s, when telephone users would spend time dialing different numbers within the telephone network in an attempt to figure out how the system worked. In 1971, phreaking entered the mainstream when Esquire magazine published "Secrets of the Little Blue Box," an article that featured Joybubbles (then known as Joe Engressia) and John Draper with regards to Joybubbles' discovery of how a 2600 Hz tone could be used to disconnect long-distance calls and allow the caller to then call anywhere for free. Draper would later build a low-cost electronic device known as a "blue box" that could generate this tone on demand and also allow the user to easily enter multi- frequency tones so a new phone number could be dialed.

Other phreaking boxes were also popular throughout the 1960s through the early 2000s including the "red box" which can emulate the tones of coins being accepted by pay phones. This device made the payphone believe the user had deposited coins when they had not, allowing free calls to be made. By the 1980s, phone phreaking had a lot of overlap with and influence on the budding computer hacking movement, which extended the spirit of exploration to computer networks instead of phone systems.

These days, advances in technology have closed many of the loopholes that were previously exploited for free

phone calls. However, the phone system is larger than ever and curious people can still pick up a phone and dial different numbers to explore the system and discover how it works from the inside out.

Provided you own a blue box (or can emulate its tones), calls made to PhreakNet numbers are blue-boxable and you can disconnect a live call and place another call from within the trunk. Similarly if you own a red box, PhreakNet has several numbers you can dial that will give you a simulated payphone trunk that will respond to coin (red box) tones. Check out the section on **Star Codes** later in the zine for how to access them!

For more information on building your own red box or blue box, check out https://philtel.org/phreaking

Get in Touch!

Do you or someone you know have ownership of a location where a payphone can be installed?
Do you have hardware you think we may be interested in?
Do you want to sponsor a phone?
Let us know!

Are you an artist **who works with audio**?
PhilTel could serve as a host for your project and allow people to access it via phone.
Are you a hacker, artist, or engineer? Like what we're doing and want to get in on it?
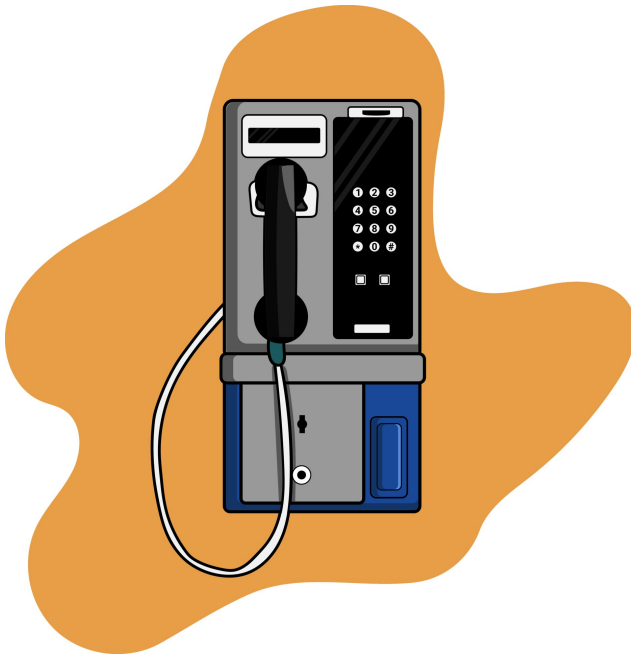We'd love your help!

- Email us directly: hello@philtel.org
- Call us from any PhilTel phone, **1-400-892-7445**
- Subscribe to our mailing list, **groups.io/g/philtel**
- Chat via Matrix/Element. **#philtel:matrix.org**
- Chat via IRC (Matrix bridged), **irc.libera.net/#philtel**
- Tweet us at **@philtelco**
- Toot us at **@philtel@jawns.club**

Donations

PhilTel is self-funded by members and turns no profit. If you would like to help us keep services active and acquire new equipment for future installations, there are several ways you can donate (including hardware, we want the old payphone gathering dust in your basement!):

- On our site, https://philtel.org/donate/
- Via Ko-fi, https://ko-fi.com/philtel
- Or, you can drop any spare coins into the coin slot of a PhilTel phone (sorry, no change given).

Helpful Services

Here are some services to use for support, whether you are using a PhilTel phone or not.

Emergency Services - 911
Suicide and Crisis Lifeline - 988
Community-based Services - 211
City Government Services - 311
Travel Info - 511
Philadelphia Domestic Violence Hotline - 1-866-723-3014
Einstein's Crisis Response Center - 1-215-951-8300
Trevor Project (LGBTQ Youth Crisis Line) - 1-866-488-7386
Trans Lifeline - 1-877-565-8860
LGBT National Hotline - 1-888-843-4564
National Human Trafficking Hotline: 1-888-373-7888
Philadelphia Dept. of Human Services - 1-215-683-4347
Philadelphia Office of Supportive Housing - 1-215-686-7105
Philadelphia Office of the Mayor - 1-215-686-218
Pennsylvania Governor's Office - 1-717-787-2500

Interesting Numbers

Many people run interesting and fun services over the PSTN, give these a call!

Callin' Oates - 1-719-266-2837
Santa's Hotline - 1-605-313-4000
Naval Observatory Time - 1-202-762-1401
Dial-A-Poem - 1-514-558-8649

Telephone Test Numbers

Telephone companies create and use phone numbers all the time for diagnostic/testing purposes. While some may be aimed at the public, most are probably meant for internal use. Some of them may be so old they aren't useful anymore and someone forgot to take them offline!

Echo Test - 1-909-390-0003
Milliwatt Test - 1-425-226-0020
MCI ANAC - 1-800-444-4444
Bell Atlantic Test Number - 1-570-387-0000
Funny Announcement Test Message - 1-914-737-9938
Coin Deposit Message - 1-610-797-0014

PhreakNet Numbers

As previously stated, PhilTel phones have connection to the PhreakNet telephone network. Though PhreakNet numbers follow the 7-digit NXX-XXX format, they can be dialed from a PhilTel phone by prefixing the number with 1-400. Therefore, any PhreakNet number can be dialed in the format 1-400-NXX-XXX. PhreakNet has a full directory of numbers available at
https://portal.phreaknet.org/directory

Time & Temperature - 1-400-POP-CORN
(1-400-767-2676)
Payphone Radio - 1-400-231-3000
WXPN 88.5 FM Philadelphia - 1-400-231-3976
Addition Math Game - 1-400-231-6110
PhreakNet Conference - 1-400-231-2111

Star Codes

PhilTel phones have star codes which provide quick access to special numbers you can utilize. Star codes are dialed by pressing the star (*) key followed by a two-digit number.

We don't have many star codes now, but we have plans for them in the future (including integrating with other projects)!

Coin Trunks

Coin trunks can simulate older payphone behavior, allowing users to red-box the phone before calling a PhreakNet number. For more information, see the **Phreaking** section in this zine!

NOTE: PSTN numbers cannot be dialed from coin trunks.

*11 - Pre-Pay (Coin First) coin line, CoinZone coin trunk
*12 - Post-Pay (WECo) coin line (CoinZone coin trunk)
*13 - Dial-tone first coin line (CoinZone coin trunk)
*14 - Dial-tone first coin line (ACTS coin trunk)
*15 - Semi-Dial-tone first coin line (CoinZone coin trunk)
*16 - Dial-tone first coin line (Nortel TOPS ACTS trunk)

Thanks to PhreakNet for providing integration with their network and support for getting PhilTel running.
https://phreaknet.org

Thanks to Iffy Books for supporting the project and hosting a PhilTel phone.
https://iffybooks.net

Thanks to Futel for providing inspiration and showing that people can install and run free-to-use payphones.
https://futel.net

Thanks to Pixel for copy editing and illustrating the cover of this zine.
https://www.pixouls.xyz

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