APRS®
Stand Alone Message Receiver

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Abstract

APRS, Automatic Position Reporting System, has evolved quit a lot over the last eight years. We can run APRS from our home, we can run APRS from our car. We can run with a computer in the car, or we can run with just a tracker unit. In this later case, we have stand-alone trackers, we have MIC-Es, PIC-Es and Kenwood Data Radios, In the case of MIC-Es, PIG-Es, and stand-alone trackers, the position data is being transmitted, but the received data is going nowhere. In these cases, for the most part it doesn't matter where the received data goes because we are not in a situation to use that data anyway. However, what if someone wanted to send you a message? If you have a MICE, PIC-E, or a stand-alone tracker, you just can't receive messages. The Kenwood TH-D7 can receive messages, but the other tracker units cannot. Wouldn't it be nice if you could receive messages even if you didn't have a computer hooked up in your vehicle. In addition, wouldn't it be nicer if we could receive the messages via voice?

Background

We (The Sproul Brothers) have Honda Goldwing motorcycles. These are big touring motorcycles that have a built-in CB radio and built-in AM/FM/Cassette system. They also have fully integrated intercom systems so that the driver and passenger can talk despite the high noise levels encountered at 65 mph on the highway. We have integrated Kenwood V7-A, dual-band radios with the VS-3 speech option into these motorcycles. We also have Radar detectors with

speech output. All of these audio sources feed into the audio system that feeds the speaker/microphone setup in the helmet. The driver and passenger can hear all of the different audio sources, they can talk to each other via the VOX activated intercom, and they can both talk on the CB or Ham radio via push-to-talk switches. There is switch that selects between the CB or Ham Radio. This switch not only switches which radio is hooked to the microphone and push-to-talk button, but it also switches the controls on the handle bar.

We have also added GPS units for navigation and for APRS tracking. We use either the Garmin GPS III+ or the Garmin Street Pilot. These GPS units and their maps are fully readable will riding the motorcycle. The APRS tracker uses the advanced data capabilities of the Kenwood TM-V7-A radio so that only one radio is needed for both voice and APRS tracking. We take advantage of the Voice output of the VS-3 option on the V7-A so that when we change settings on the radio, we get voice feed back from the radio. This makes it so we do not have to look at the radio display as closely.

What we would like is a unit that listens to the data coming in from the TNC, and if it sees an APRS message TO me, it will SPEAK the message into the audio system on the motorcycle. In addition to speaking messages that are to my specific call sign (WU2Z-10) I want it to speak any message to ANY of my other stations, WU2Z, WU2Z-3, etc. This would give me a hands-free method of receiving these messages safely. This not only applies to riding a motorcycle, but also when driving a car.

Design

If this project was being done on a normal desktop computer, there would be very little work involved. On the Macintosh, Text-to-Speech is built into the operating system and it only takes one line of code, literally, to do. On Windows, there is an AGENT that will do text to speech. The Windows version is much more complicated than one line of code, but is still quite simple to implement. MacAPRS has had message-to-speech for a long time and we will be implementing it on WinAPRS later on. When trying to design a system for text-to-speech from scratch, there is MUCH more work to be done.

You need a speech chip of some sorts, and you need a microprocessor with enough memory and speed to handle all of the involved processing. A normal PIC chip has the speed needed, but this project takes much more memory than the normal PIC chips. Recently, the PICs have become available in much larger configurations and this how we hope to implement this project. Steve Bible, N7HPR, from TAFR, has been helping us with the PIC aspects of this design.

The software in the PIC chip watches the incoming data and if it sees any messages to my call, it saves them and speaks the message. The system saves the 4 most recent messages to me, and allows me to replay them. This REPLAY feature is very important because if I can't hear it the first time, I need to be able to push a simple button and get it to play again. Pushing the button twice quickly, will replay the second one back, three times, the third, etc.

The main problem with this project is finding a good text-to-speech chip or phoneme-to-speech chip set. Given a good chip for the actual speech, the rest of this becomes fairly easy.

Vocabulary

Another reason that this project needs a reasonable amount of extra memory is all of the abbreviations used in Ham radio. Ham Radio has its own 'vocabulary'. For example, there are abbreviations of many common words used in ham radio. Many of these abbreviations trace their roots all the way back to the CW days. These abbreviations need to be taken into account and pronounced as a Ham would expect. The table below lists some of the common ones.

CUL See You Later
CQ Needs to be pronounced as letters, 'C' 'Q' or SEEK YOU
FB Fine Business
PSE Please
QSL Needs to be pronounced as letters 'Q' 'S' 'L'
TNX Thanks
UR You Are
YL Young Lady
XYL ex Young Lady

Conclusion

This could be a very useful addition to the APRS community. This unit and a MIC-E/PIC-E would make for a good communications system that could be left in your car all the time. With its message retrieval capability, you could also get messages that were received when you where not at your there.

Many modern radios have speech options available for them. Wouldn't it be nice if these message speaking capabilities were available as an option to put right into the radio?

References

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http://www.tapr.org/tapr/html/pice.html TAPR's PIC-E site

http://www.marc.org/ MARC, Motorcycle Amateur Radio Club

http://msproul.rutgers.edu/Goldwing.html/ Mark Sproul's Goldwing web site