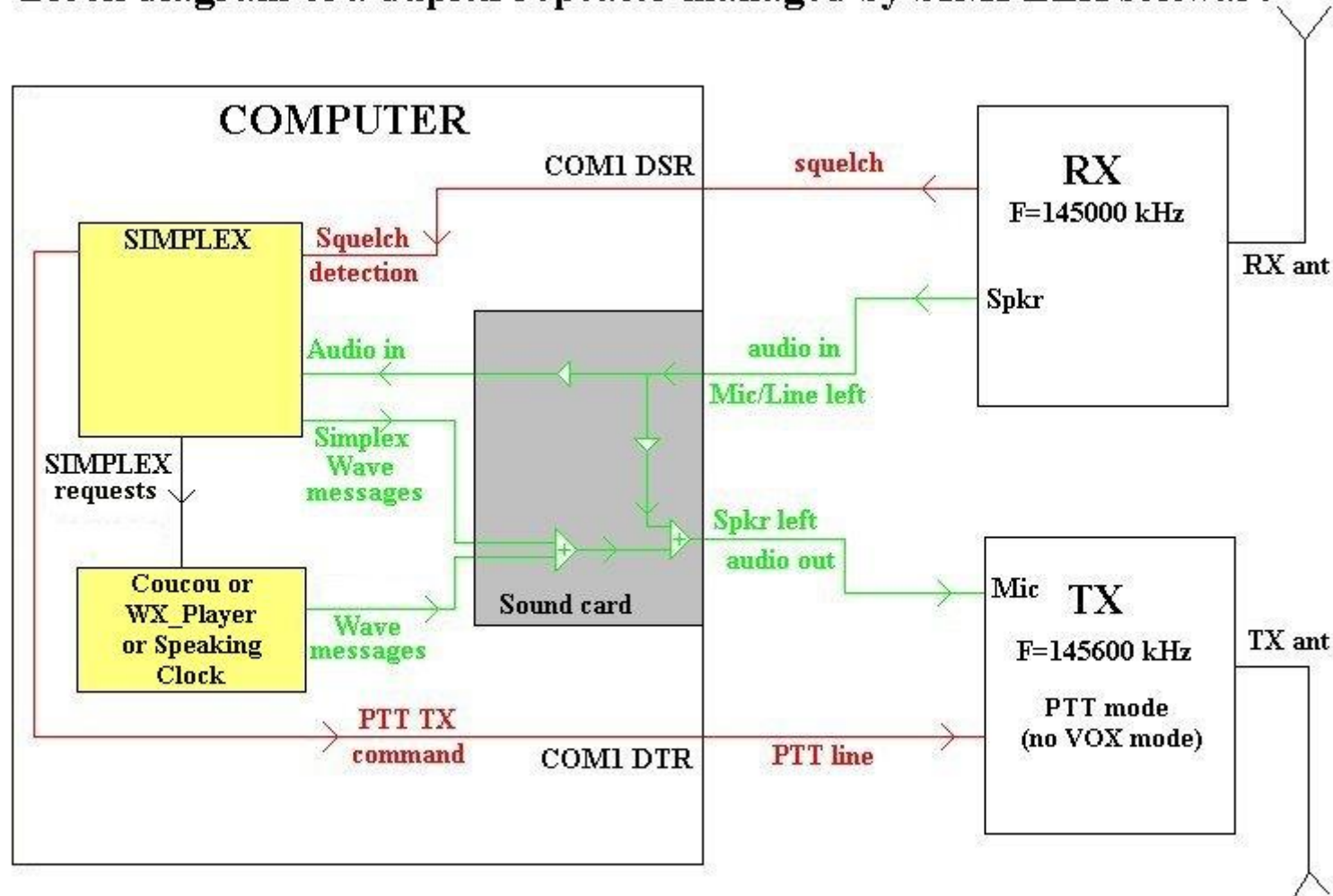


## **HOW DOES SIMPLEX WORK ?**

## Block diagram of a duplex repeater managed by SIMPLEX software



This block diagram is intended to make users understand how SIMPLEX manages a [duplex repeater](#).

Only for a better understanding, it represents a VHF duplex repeater with a 145000kHz RX frequency and a 600Khz frequency shift for transmitting but the user can obviously choose what he likes.

The block diagram also uses left audio channel of the sound card and COM1 serial port for RX/TX control but the user may also change this and uses the right channel if he likes and uses another COM port or the LPT port if he prefers. The squelch detection may be replaced by a VOX detection but it is recommended to use squelch detection which is more reliable.

Here it will be explained how SIMPLEX manages a classical duplex repeater. At the end of this page, the management of a simplex repeater or a transponder will be shortly approached.

In such a duplex repeater, the receiver (TX) is always on duty and its audio is sent continuously to the MIC/Line input of the sound card. It is routed to the output (Spkr) of the sound card (internal switching in the sound card) and simultaneously treated by SIMPLEX. As it can be seen, the received audio is sent back to the MIC input of the transmitter. As the transmitter is normally OFF (not transmitting), this audio is just present on the MIC input of the transmitter but awaiting (BE SURE THAT THE TRANSMITTER IS NOT IN VOX MODE !).

The main function of SIMPLEX is to decide if the received audio must be retransmitted on the air by the transmitter or not. For that, SIMPLEX continuously checks the contents of the received audio signal **and** the RX squelch signal. According to the choice of the user, the PTT command (TX ON) will be sent or released on the transmitter. Three main modes are possible :

- Transparent mode : the squelch signal detected by SIMPLEX will open the repeater and set the transmitter in transmit mode. The repeater closes after a given space of time starting when the squelch signal disappears.
- Audible tone opening : SIMPLEX will open the repeater when detecting both the squelch signal and a single short audible tone (ex 1750Hz). The repeater closes after a given space of time starting when the squelch signal disappears.
- Sub-audible tone (CTCSS) opening : SIMPLEX will open the repeater when both detecting the squelch signal **and** a continuous subaudible tone inside the received audio signal. The repeater closes after a given space of time starting when either the squelch signal disappears or the subaudible tone is no more inside the received audio signal.

Alongside this main function, SIMPLEX will generate some service Wave messages according to the choice of the user : HELLO (repeater opening), K (received audio stops, invitation to transmit), GOODBYE (repeater closing), TIMEROUT (repeater closing on timerout), BEACONS, personnal messages. Time and meteo beacons might generated by WX\_PLAYER, Speaking Clock DeLuxe or the Coucou software.

Now a few words about the management of a **simplex repeater** by SIMPLEX.

In this case, SIMPLEX works just like a recorder that records an audio signal and then replays it (Playback). You just need a single transceiver that will switch from receive to transmit mode on control of SIMPLEX. Detection modes are the same as for a duplex transceiver. Same Wave messages are generated as for duplex mode. The main difference inside SIMPLEX with the duplex mode is that the received audio signal is recorded inside the computer until it stops (or on timerout) and then replayed. In case of a duplex repeater, SIMPLEX does not record the received signal. It just treats it continuously to decide how to control the transmitter.

Finally, some words about the management of a **transponder** by SIMPLEX.

**The transponder is a repeater for cross-band traffic. Let us suppose cross-band traffic between the VHF and the UHF bands. The transponder contains two classical transceivers, one VHF transceiver and one UHF transceiver. When the transponder is closed, SIMPLEX listens for both VHF and UHF transceivers which are both in receive mode. As soon as SIMPLEX receives some audio signal from a transceiver (say VHF), it will retransmit this audio to the UHF transceiver which then will remain in transmit mode all along the time something is received from the VHF transceiver. When nothing more is received from the VHF transceiver, both transceivers are reset to receive mode and SIMPLEX listens for the two transceivers. And so on ... Note that in a transponder the two transceivers never transmit at the same time : either they both receive or ONE of them retransmits what the other receives.**

Detection modes are the same as for a duplex transceiver. Same Wave messages are generated as for duplex mode.

The software package contains detailed help files and basic schematics of cabling between your computer and the receivers and transmitters. You may also find some of these schematics on this page : <http://f6dqm.free.fr/schematics.htm>