



*Mississauga Amateur Radio
Club Repeaters*

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Mississauga Amateur Radio Club

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Repeater Group

- *Michael Brickell, VE3TKI (repeater manager)*
- *John Duffy, VE3DRZ (repeater sponsor)*
- *Lorne Jackson, VE3CXT*
- *Tony Champion, VA3QC*
- *Art Sinclair, VE3SQG*
- *Robin Stubbs, VE3VVS*
- *Asim Zaidi, VE3XAP*
- *Bill Reid, Jr VA3QB*

What Does A Repeater Do?

- *receives an input signal and retransmits it simultaneously at higher power*
- *extends the range of handhelds, mobiles*
- *the input frequency and the output frequency are offset from each other slightly*
- *CTCSS tones are used to avoid interference with other repeaters*
- *frequency pairs are coordinated via WNYSORC*

VHF Repeater

- *Kenwood TKR-720, on emergency power circuit*
- *transmits on 145.430 MHz*
- *receives on 144.830 MHz (i.e. -600 kHz offset)*
- *requires a 103.5 Hz CTCSS subaudible tone on receive to unsquelch the audio and activate the transmitter*
- *generates a 103.5 Hz tone internally and retransmits it*
- *located at Hurontario & Central Parkway in condo elevator room*

UHF Repeater

- *new UHF repeater will be GE Mastr II*
- *transmits on 444.575 MHz*
- *receives on 449.575 MHz (i . e. +5 MHz offset)*
- *will require a 103.5 Hz CTCSS subaudible tone to activate tx (none at present)*
- *currently has internal controller; in future will use the RLC-3*

Antenna (1)

- *4 bay (element) collinear array*
 - *each of the elements is a dipole*
 - *the elements are phased using coaxial cable*
 - *the signal to the elements below the uppermost element are progressively delayed in time so that the signals from all four elements are transmitted simultaneously*
 - *the radiation pattern is almost omni-directional (a cardioid), with a small null to the south*
- *antenna is connected to repeaters via 7/8 inch Heliax coaxial cable about 30 feet long*
- *elevation is about 670 feet asl*

Antenna (2)



Huronario & Central Parkway



Distance

Coupler

TX: 444.575

RX: 449.575

UHF Repeater

Coupler

TX: 145.530 MHz

RX: 144.930 MHz

VHF Repeater
Control Unit

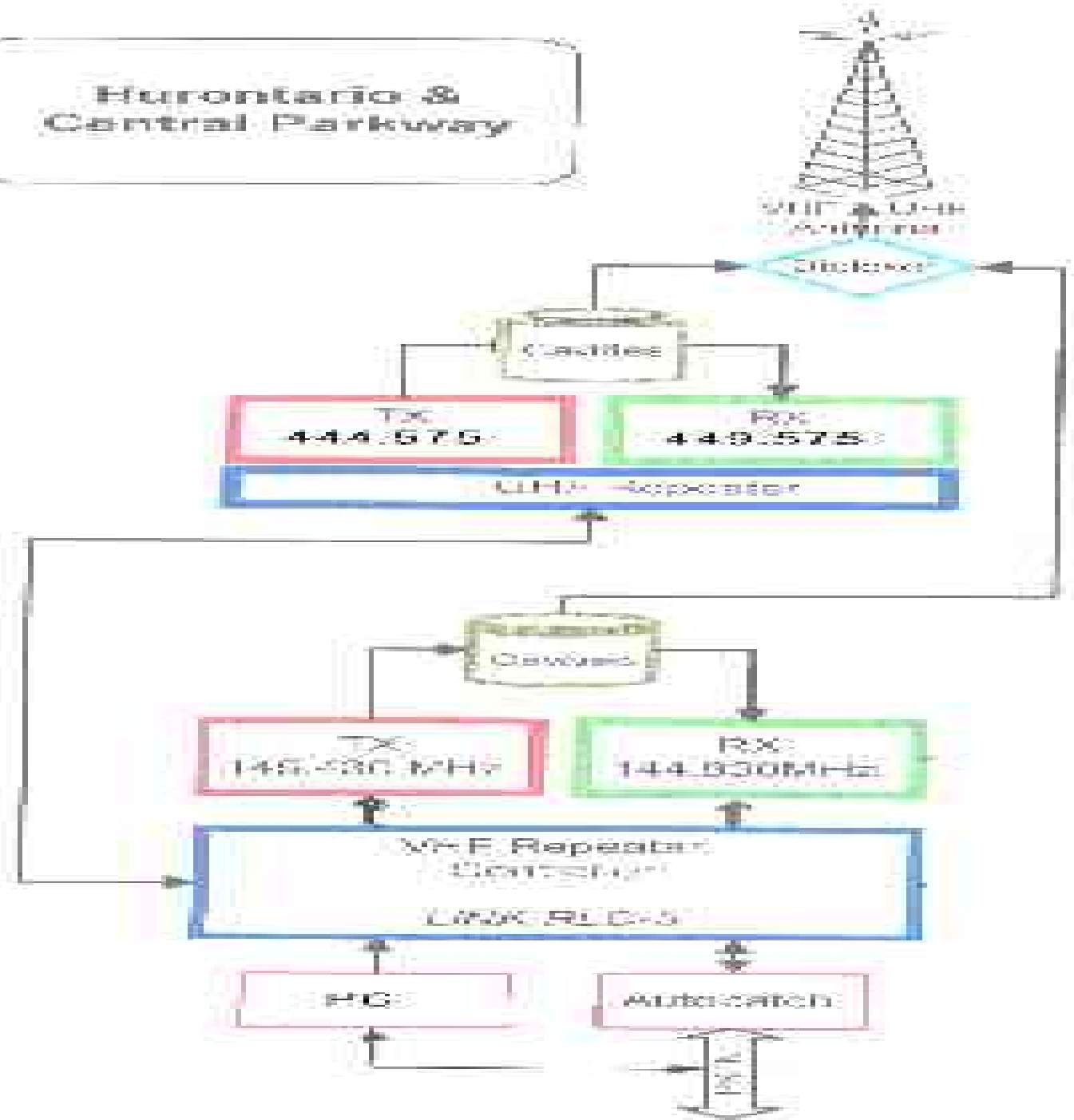
EMERGENCY

HTS

Autoswitch

10V

(Future)



What are Subaudible Tones?

- *CTCSS - Continuous Tone Coded Squelch System*
- *used to minimize interference*
- *transmitter (e.g., your hand held) generates a low frequency (sub-audible) tone as part of its signal*
- *if repeater receiver decoder detects the tone it opens the audio squelch and allows the signal to be re-transmitted*
- *our repeater generates a 103.5 Hz tone on transmit so you can set your receiver to require the tone to unsquelch*

The Controller (1)

- *Link RLC-3*
- *4 radio cards, autopatch, I/O board, DVR*
- *each repeater is connected to a radio card*
- *repeater receiver sends COR signal, rx audio to card if it hears the CTCSS tone*
- *the radio card then sends a PTT signal and tx audio to the transmitter*

The Controller (2)

- *looks after timing functions, creates courtesy tones, ids, voices (Romeo, Romeo Jr, Juliette), cover tones*
- *internal DVR can be programmed to make announcements*
- *controls the autopatch*
- *I/O board can be used to perform various functions, e.g. turn on fans, monitor temperatures*
- *controller is normally programmed remotely via an on site pc using PCAnywhere*

What is a DTMF Tone?

- *Dual Tone Multi Frequency*
- *hitting a key on the keypad generates a DTMF audible tone of two frequencies*
- *one frequency corresponds to the keypad row; the other to the keypad column*

What are Cover Tones?

- *Cover tones are generated by the controller*
- *are used to make very difficult to decipher a DTMF tone*
- *prevents a hacker from decoding repeater control codes, phone numbers, etc*

Temperature Functions

- *3 LM335 temperature sensors*
 - *“out side” temperature*
 - *repeater temperature*
 - *repeater area temperature*
 - *connected to I/O board*
- *controller is programmed to report temperatures on request*

Repeater Control Codes

- *Codes are in the repeater files section*
- *29 for date*
- *26 for time (Romeo)*
- *27 for time (Juliette)*
- *23 for "out side" temperature*
- *24 for repeater heat sink temperature*
- *25 for repeater area temperature*
- *note there is no S meter function*

Basic Repeater Etiquette

- *Please ALWAYS id, even if only getting a temperature (legal requirement)*
- *wait for the courtesy tone before transmitting*
- *keep transmissions short (someone may need to use the repeater for an emergency)*

What about Deliberate Interference?

- *DON'T respond, EVER; this is what the jammer wants*
- *either carry on with the conversation, or wait until later*
- *if you can, listen to the jammer on reverse, to help locate him*

The Autopatch

- *Used to make phone calls from the repeater*
- *remember that you are talking in public (don't give out your PIN#!!)*
- *tell the other person you are on the air*
- *only one party can talk at a time*

How to Use the Autopatch

- *First, ID (ve3tki for the patch)*
- *key * followed by the 2 digit “on” code, and then the phone number (without dropping the transmission)*
- *unkey, the autopatch will start reading out the number, and then it will dial*
 - *if you do not want the number to be transmitted, key up as it starts saying the number to start the cover tones*
- *at the end of the conversation, key in * and then the “off” code*
- *finally, give your call when asked (ve3tki clear of the patch)*