

Voter.conf

wiki.allstarlink.org

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1 Voter.conf

Legacy Version - This page is about a legacy version of AllStarLink. See ¹

¹ https://allstarlink.github.io/config/voter_conf

2 Introduction

This file sets up the `chan_voter` channel driver to interface with `app_rpt`.

Remember, in `rpt.conf`, you will need a directive to use the `chan_voter` channel driver:

```
rxchannel = Voter/1999
```

The `1999` should match the corresponding *instance* stanza defined in `voter.conf` that holds all the definitions for your clients.

The VOTER/RTCM may be used in any of 3 modes:

- non-voting client mode
- voting mode
- voting and simulcast mode

See the VOTER¹ page for additional information.

¹ <https://wiki.allstarlink.org/wiki/VOTER>

3 voter.conf

The `voter.conf` file is generally going to be located with the rest of the Asterisk configuration files, in `/etc/asterisk`.

There **must** be a `[general]` stanza that contains directives that are common to all the `chan_voter` *instances*. Some directives may be allowed in the `[general]` stanza and/or be defined on a per-client basis with the client definition directive.

In addition, there **must** be at least **one** *instance* stanza defined. An *instance* is a group of clients that are all related to each other. In a typical voting repeater scenario, the *instance* would typically be the **node number**, and all the clients would be the transmitter client and all the voting receiver clients associated with that repeater.

It is a valid configuration to only have one client defined in an *instance*. You might have this if you are just using the VOTER/RTCM as a RoIP adapter to connect a remotely located repeater back to a host over Ethernet.

You may have more than one client defined as a transmitter, as in the case of a simulcast system. Any client with a transmitter directive defined will be sent transmit audio packets associated to that *instance*.

Each client directive has a number of optional attributes associated with it that may, or may not, be required depending on your system configuration.

There are also configuration directives that apply to an entire *instance* (and **all** the defined clients within it).

The voter.conf file is structured as shown below (as in all other Asterisk configuration files, lines preceded with a semi-colon ";" are treated as a comment):

```
[general]
;bindaddr = 10.10.10.1      ; specify a particular IP address to bind to (not
generally used, defaults to bind to all interfaces)
port = 667                 ; specifies the UDP port to use for incoming connections
buflen = 480              ; specifies the receive buffer length in milliseconds.
                           ; This parameter should be set to the maximum expected network
latency,
                           ; plus a little padding (100 milliseconds of padding is a good
amount).
                           ; The default is 480 milliseconds, the minimum is 320
milliseconds.
                           ; Buffer length may be specified on a per-stanza and per-client
basis, see below.

password = secret_password ; password common to all clients (Main Menu Item 6
- Host Password, on RTCM/VOTER)
utos = y                  ; Turn on IP TOS for Ubiquiti (ToS is enable by default on
the RTCM/VOTER) from the host TO the clients

;sanity = 0               ; disable sanity checking of clients (debug use only)
defaults to 1 if not specifically set to 0
;puckit = 1               ; KLUDGE to try and fix random Garmin LVC-18 pucks that
may or may not be 1 second off (defaults to 0 if not specified or set to 1)

[1999]
Main = secret,transmit,master ; define the 1999 instance stanza
er,transmit,adpcm,nulaw,nodeemp,noplfilter,buflen=value,gpsid[=value],prio=value
;
; master - this client is the Master Timing source (the RTCM
client that is on the same LAN as the Asterisk server.)
; There can only be 1 Master Timing source per ENTIRE Asterisk
server.
;
; secret - password unique to this client
; transmit - this client is intended to have transmit audio sent
to it and will have a transmitter connected to it.
; adpcm - this client is to be sent audio in 8000 samples/sec,
4-bit, IMA ADPCM format, rather than default G.711 Mulaw (aka ulaw).
; nulaw - this client is to be sent audio in 4000 samples/second
Mulaw (Nulaw, as we call it), rather than the standard 8000 samples/second.
; nodeemp - this client is not to perform de-emphasis of the
receiver audio (This is only to be used with non-voting clients). Switches
; the hardware de-emphasis filter OUT on the client
; noplfilter - this client is to not to perform hardware pl
filtering of the audio. Switches the hardware PL filter OUT on the client.
; buflen=value - receive buffer length override for this client
only.
; gpsid[=value] - This specifies a gps identity to associate
with the specified client (as referred in the /etc/asterisk/gps.conf file).
; prio=value - define a specific priority for this client when
voting. Lower numbers are higher priority. Default is 0 if nothing specified.

plfilter = y              ; use DSP IIR 6 pole High pass filter, 300 Hz corner
with 0.5 db ripple (note clients filter PL by default already)
txtcss = 100.0            ; Transmit CTCSS frequency
txtcsslevel = 62         ; Transmit CTCSS level (default of 62 if txtcss is
supplied, but txtcsslevel is not set)
txtoctype = phase        ; Transmit tone control type: none,phase,notone
```

```

        ; none - CTCSS tone encoding with no hang time (default)
        ; phase - encode CTCSS and reverse phase (AKA "reverse burst")
before unkeying TX
        ; notone - encode CTCSS and stop sending tone before unkeying TX
(AKA "chicken burst")

;gtxgain = 3.0          ; adjust the audio gain to all transmitters (in db
voltage gain)
;hostdeemp = 1         ; force the use of the DSP FIR Integrator providing
de-emphasis at 8000 samples/sec. Used with Duplex Mode 3 setting in RTCM/VOTER

thresholds = 255,110=5 ;
; linger=6             ; linger default is 6 if no other value specified
; streams = 67.215.233.178:1667 ; location to send voter data stream for this
instance (used only with votemond Java program, which is deprecated)

; isprimary = y        ; used in redundant server applications only. must be
set on the primary server only
; primary = 10.20.20.1:667,mypasswd ; used in redundant server applications
only. must be ONLY set on the secondary server to point to the primary

[1998]                 ; define another voting instance on this server (for
another node). Three simulcast transmitters and four receivers.
        ; NOTE: there is NO "master" in this instance, since we already
have a master timing source on this server defined above

NORTH = password_1,transmit ; transmit/receive site
SOUTH = Password_2,transmit ; transmit/receive site
EAST = password_3,nodeemp   ; receive-only site, bypass de-emphasis filter
in RTCM
WEST = Password_4,transmit,noplfilter ; transmit/receive site, bypass CTCSS
filter in RTCM

```

Of course, the above denotes all the possible options that you can define in `voter.conf`. A typical "bare minimum" to get on the air would be more along the lines of:

```

[general]
port = 667          ; specifies the UDP port to use for incoming connections
buflen = 480        ; specifies the receive buffer length in milliseconds.
                    ; This parameter should be set to the maximum expected network
latency,
                    ; plus a little padding (100 milliseconds of padding is a good
amount).
                    ; The default is 480 milliseconds, the minimum is 320
milliseconds.
                    ; Buffer length may be specified on a per-stanza and per-client
basis, see below.

password = secret_password ; password common to all clients (Main Menu Item 6
- Host Password, on RTCM/VOTER)
utos = y            ; Turn on IP TOS for Ubiquiti (ToS is enable by default on
the RTCM/VOTER) from the host TO the clients

[1999]              ; define the 1999 instance stanza

Main = secret,transmit,master ; master - this client is the Master Timing
source (the RTCM client that is on the same LAN as the Asterisk server.)
                    ; There can only be 1 Master Timing source per ENTIRE Asterisk
server.

```

```
        ; secret - password unique to this client
        ; transmit - this client is intended to have transmit audio sent
to it and will have a transmitter connected to it.
```

```
Remote = secret2      ; satellite receiver site only
```

4 [general] Stanza

The [general] stanza defines all the configuration directives that apply to `chan_voter`, and all *instances* in the `voter.conf` file.

```
[general]
;bindaddr = 10.10.10.1      ; specify a particular IP address to bind to (not
generally used, defaults to bind to all interfaces)
port = 667                 ; specifies the UDP port to use for incoming connections
buflen = 480               ; specifies the receive buffer length in milliseconds.
                           ; This parameter should be set to the maximum expected network
latency,
                           ; plus a little padding (100 milliseconds of padding is a good
amount).
                           ; The default is 480 milliseconds, the minimum is 320
milliseconds.
                           ; Buffer length may be specified on a per-stanza and per-client
basis, see below.

password = secret_password ; password common to all clients (Main Menu Item 6
- Host Password, on RTCM/VOTER)
utos = y                   ; Turn on IP TOS for Ubiquiti (ToS is enable by default on
the RTCM/VOTER) from the host TO the clients

;sanity = 0                ; disable sanity checking of clients (debug use only)
defaults to 1 if not specifically set to 0
;puckit = 1                ; KLUDGE to try and fix random Garmin LVC-18 pucks that
may or may not be 1 second off (defaults to 0 if not specified or set to 1)
```

4.1 bindaddr, port, password

Typically, *bindaddr* is not specified (it defaults to "INADDR_ANY"). It is supported, however, should you need to bind your VOTER clients to a specific IP interface on the server.

The *port* directive specifies the **listening UDP port** that `chan_voter` is listening on for incoming connections from clients. When clients power on, they attempt to contact the *VOTER Server Address* at the *VOTER Server Port*, defined in their on-board configuration

settings. See the [Menu Structure and Definitions](#)¹ page for further explanation of those configuration settings. This is the **incoming** port you may need to let through your firewall.

The *password* directive specifies the *Host Password* that needs to be configured in the VOTER client. This is the password for the **server** as a whole for the clients to authenticate with.

4.2 utos

Short for "Ubiquity Type of Service". When set, it will mark **outbound** packets (from the host **to** the client) with the ToS header flag of *0xC0*. This is ToS precedence Level 6 or "Internetwork Control".

Used in traffic shaping. If your network is that congested that you need to shape traffic... you might have bigger issues. However, it doesn't hurt to flag the traffic when transiting the Internet to remote sites.

Note: As of VOTER/RTCM firmware >v2.00, the clients will automatically mark **their** outbound traffic (**to** the host) with the same flag. That can now be **disabled** by setting the appropriate `Debug Option`². Older versions of firmware (<2.00) did not flag the traffic by default, and required it to be **enabled** with the `Debug Option`.

4.3 sanity, puckit

These directives are really only for debugging.

sanity tells `chan_voter` to **disable** all sanity checks for clients. You would never want to do that in production.

¹ <https://wiki.allstarlink.org/wiki/VOTER-Menus>

² https://wiki.allstarlink.org/wiki/VOTER-Hardware#Debug_Options

puckit attempts to fix a problem with Garmin GPS pucks. Use at your own risk. Per Jim's notes in the source:

```
/* This is just a horrendous KLUDGE!! Some Garmin LVC-18 GPS "pucks"
*sometimes* get EXACTLY 1 second off!! Some don't do it at all.
Some do it constantly. Some just do it once in a while. In an attempt
to be at least somewhat tolerant of such swine poo-poo, the "puckit"
configuration flag may be set, which makes an attempt to deal with
this problem by keeping a "time differential" for each client (compared
with the "master") and applying it to time information within the protocol.
Obviously, this SHOULD NEVER HAVE TO BE DONE. */
```


5 VOTER Instances

Within `voter.conf`, there may exist more than one *instance*. That is defined by a stanza that is **not** named `[general]`, and is typically named for the node number it is associated with in `rpt.conf`.

This **must** match the name of the channel driver that is referenced from `rpt.conf` in the node definition there:

```
rxchannel = Voter/1999
```

It is **not** recommended to use anything other than numerical digits for the instance definition. Unpredictable results will happen (read, *doesn't work*).

This *instance* holds one or multiple client definitions that are associated with each other (ie. all operating on the same transmit/receive frequencies as part of the same repeater system).

```
[1999]                ; define the 1999 instance stanza

Main = secret,transmit,master    ; master - this client is the Master Timing
source (the RTCM client that is on the same LAN as the Asterisk server.)
                ; There can only be 1 Master Timing source per ENTIRE Asterisk
server.
                ; secret - password unique to this client
                ; transmit - this client is intended to have transmit audio sent
to it and will have a transmitter connected to it.

Remote = secret2                ; satellite receiver site only
```

The example above defines an *instance* named **1999**, and has two *clients* defined, which are named *Main* and *Remote*.

5.1 Client Definition

Each *client* in an *instance* is defined by its *client_name*, followed by all the options that are associated with that particular *client*. A *client* is a particular VOTER/RTCM hardware device that is located somewhere, connected to Ethernet and a radio, and is feeding receive audio to (and optionally receiving transmit audio from) the Asterisk host and the configured channel in `rpt.conf` through `app_rpt`.

```
Main = secret,transmit,master
```

The *client_name* (in this case "Main"), can be any alpha-numeric, non-breaking string, up to 50 characters in length. You probably want to keep it short, since you may need to type it on the Asterisk Console for debugging. You **can** use "_" in the name. This is the name that will be displayed on the Allmon/Supermon screens, when looking at voting clients.

The *secret* is a **unique** value for each client that **must** match the *Client Password* that is programmed into a particular VOTER/RTCM hardware device. This is how `chan_voter` determines which hardware client to associate with which client definition in the `voter.conf` file. The password may be up to 50 characters in length.

There must be **one** and **only** one client in the whole `voter.conf` file that has the *master* option set, regardless of how many *instances* are defined. This **must** be a VOTER/RTCM hardware device that is located on the **same physical LAN** (ie. same switch) that the Asterisk server resides on. This VOTER/RTCM does not *necessarily* need a radio attached to it (but that is common), but it **does** need a GPS. It **does not** need to be a transmitter, it can just be a receiver site, if desired. This is the client that `chan_voter` uses for master timing of all operations, and will be the reference timing source that all clients will be compared with. A *master* is not required in "General-purpose" or "Mixed Mode" client applications, where GPS is not required at all.

5.1.1 Client Options

In addition to the above, there are a number of options that can be associated with any *client*

transmit

This client will have transmit audio sent to it by the channel driver. More than one client may have transmit audio sent to them, as in a simulcast application.

adpcm/nulaw

By default, audio is sent between the client and the host in G.711 Mulaw (aka ulaw) format. This is the default, if neither adpcm or nulaw options are associated with a client.

adpcm will configure this client to exchange audio in 8000 samples/sec, 4-bit, IMA ADPCM format.

nulaw will configure this client to exchange audio in 4000 samples/second Mulaw (Nulaw, as we call it), rather than the standard 8000 samples/second.

nodeemp

nodeemp tells this client **not** to perform de-emphasis of the receiver audio using the on-board hardware de-emphasis filter. This option manually switches the hardware de-emphasis OUT on the client. This is only to be used with non-voting clients.

noplfilter

noplfilter tells this client **not** to pass the receive audio through the on-board hardware CTCSS filter. Normally, audio is filtered to remove any CTCSS tones on the VOTER/RTCM hardware client before being sent to the host. This option manually switches the hardware CTCSS filter OUT on the client.

buflen=value

buflen=value sets a specific receiver buffer length for this client. This option is used in special applications only.

gpsid=value

gpsid[/=value] specifies a gps identity to associate with the specified client (as referred in the */etc/asterisk/gps.conf* file). It is also used as the filename to create "GPS Work and Data Files" associated to the client. If no *value* is specified, default filenames are used. If a *value* is specified, it appends the supplied value to the filename with a "_".

This appears to be associated with `app_gps`, which can be used for reporting AllStarLink's position to APRS. Information on `gps.conf` can be found [here](#)¹. Sorry, better documentation is required on how to configure this option and how it works. Feel free to [contribute!](#)²

prio=value

prio=value will define a specific priority for this client when voting. Lower numbers are higher priority. Default is 0 if nothing specified. This is normally not specified, and voting will take place based on the best RSSI from all clients. This option is used in special applications only.

5.2 Instance Options

The following options affect **all** clients registered under a *instance*.

```
plfilter = y           ; use DSP IIR 6 pole High pass filter, 300 Hz corner
                        with 0.5 db ripple (note clients filter PL by default already)
txtcss = 100.0         ; Transmit CTCSS frequency
txtcsslevel = 62      ; Transmit CTCSS level (default of 62 if txtcss is
                        supplied, but txtcsslevel is not set)
txtoctype = phase     ; Transmit tone control type: none,phase,notone
                        ; none - CTCSS tone encoding with no hang time (default)
                        ; phase - encode CTCSS and reverse phase (AKA "reverse burst")
                        before unkeying TX
                        ; notone - encode CTCSS and stop sending tone before unkeying TX
```

1 <https://wiki.allstarlink.org/index.php?title=Gps.conf&action=edit&redlink=1>

2 <https://wiki.allstarlink.org/wiki/Contributing>

```
(AKA "chicken burst")

;gtxgain = 3.0          ; adjust the audio gain to all transmitters (in db
voltage gain)
;hostdeemp = 1         ; force the use of the DSP FIR Integrator providing
de-emphasis at 8000 samples/sec. Used with Duplex Mode 3 setting in RTCM/VOTER

thresholds = 255,110=5 ;
; linger=6             ; linger default is 6 if no other value specified
; streams = 67.215.233.178:1667 ; location to send voter data stream for this
instance (used only with votemond Java program, which is deprecated)

; isprimary = y        ; used in redundant server applications only. must be
set on the primary server only
; primary = 10.20.20.1:667,mypasswd ; used in redundant server applications
only. must be ONLY set on the secondary server to point to the primary
```

5.2.1 pfilter

Enabling this option, uses the internal software DSP IIR 6-pole high-pass filter that has a 300Hz corner and 0.5dB ripple on the host. Note that all VOTER/RTCM clients already employ a hardware CTCSS filter that is enabled by default. So, if you are going to use this option, you probably want to use the *noplfilter* in the client options.

If this option is not specified, it will default to disabled.

5.2.2 txctcss/txctcsslevel/txtotype

These options control the generation of transmit CTCSS. Refer to the VOTER Audio page³ for further details on the different applications and required radio connections (direct modulator).

txctcss is any *valid* CTCSS tone.

txctcsslevel is the level of the CTCSS tone to generate. If no level is specified, then it will default to a level of 62.

³ <https://wiki.allstarlink.org/wiki/VOTER-Audio>

txtoctype is the type of CTCSS turn-off to use when the transmitter unkeys. It defaults to **none**, where the tone ends at the same time as the PTT unkeys. This usually isn't handled well by many radios, and results in squelch crashes in their receivers. The **phase** option (also known as "Reverse-burst") reverses the phase of the CTCSS tone, just before unkeying the transmitter. This is how Motorola turns off CTCSS tones, and was originally designed to force CTCSS reeds to stop vibrating by applying opposite polarity to them. The **notone** option is similar to the **none** option, except here the CTCSS tone is stopped just prior to the transmitter unkeying. The theory behind that being, it gives time for the user's radio to detect the loss of CTCSS tone and squelch, before the transmitter drops, preventing the squelch from crashing.

Beware using this option, as it affects whether pre-emphasis is applied to your audio, or not. That means it affects how you have the RTCM/VOTER connected to your radio's transmitter. Using this option means you **must** be using a direct modulator connection, and **not** the mic audio input. Note that it is a valid configuration to use a direct modulation connection, and specify the *txctcsslevel* as 0 to correctly modulate the transmitter, but not send a CTCSS tone.

5.2.3 gtxgain

This is a bit of an obscure option that is not widely known/used. It, can be used to adjust the audio gain sent to all transmitters. The value is a floating number (versus an integer), and is in dB.

```
p->gtxgain = pow(10.0,atof(val) / 20.0);
```

The default, if nothing is specified, is 0.0. Positive and negative values are supported.

The value is **voltage gain**, so 3dB would increase the transmitter audio level by 1.41, 6dB would double the amplitude.

5.2.4 hostdeemp

Note that this option only works on a **per-instance** level.

This option is used with the "Duplex Mode 3"⁴ setting in the RTCM/VOTER.

This option forces receive audio **from all clients** to be sent through the host's DSP FIR Integrator providing de-emphasis at 8000 samples/sec. (normally, de-emphasis is done on the VOTER/RTCM hardware client before being sent to the host). This option is used in special applications only.

Note: The de-emphasis only takes place between the receiver (received audio) and the channel driver in Asterisk. Recall that Duplex Mode 3 does "in-cabinet repeat", so the receiver audio is sent to the transmitter without any processing (ie de-emphasis).

5.2.5 thresholds/linger

The *thresholds* and *linger* options determine how the voting algorithm works. You can find a thorough explanation on how to set these parameters on this page⁵.

5.2.6 isprimary/primary

The options configure hosts configured in redundant host applications. You can find a thorough explanation of how this works in the Redundant Proxy Mode⁶ explanation.

Suffice to say, on the "primary" server, you would use the *isprimary* option (set to **y**). On the "secondary" (backup) server, you would use the *primary* option to point to the IP address of

4 https://wiki.allstarlink.org/wiki/RTCM_Channel_Driver#Duplex_Mode_3 Hostdeemp
5 https://wiki.allstarlink.org/wiki/VOTER#Voting_Selection_Algorithm_and_Associated_Parameters
6 https://wiki.allstarlink.org/wiki/RTCM_Channel_Driver#Redundant_.22Proxy.22_Mode

the primary server. Note that the *primary* option also needs the port and the host password of the primary server, in order for it to properly authenticate.

6 Related Pages

Documentation on the VOTER/RTCM is extensive, and as such, has been split across multiple pages. They are usually linked, where appropriate, throughout the content. However, here are all the related pages that are available:

- [Main VOTER Page](#)¹
- [Original VOTER Hardware Documentation](#)²
- [RTCM Hardware Documentation](#)³
- [Menu Structure and Definitions](#)⁴
- [Firmware Upgrading](#)⁵
- [Audio Interfacing and Configuration](#)⁶
- [GPS Interfacing and Configuration](#)⁷
- [chan/voter and Asterisk Console Documentation](#)⁸
- [Simulcasting Configuration](#)⁹
- [Buffer Tuning](#)¹⁰
- [Interfacing to the Motorola Quantar](#)¹¹

6.1 Contributors

- [VE7FET](#)¹²
- [WD6AWP](#)¹³
- This page was last edited on 5 June 2025, at 00:18.

1 <https://wiki.allstarlink.org/wiki/VOTER>
2 <https://wiki.allstarlink.org/wiki/VOTER-Hardware>
3 https://wiki.allstarlink.org/wiki/RTCM_Client
4 <https://wiki.allstarlink.org/wiki/VOTER-Menus>
5 https://wiki.allstarlink.org/wiki/RTCM_Firmware_upgrading
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8 https://wiki.allstarlink.org/wiki/RTCM_Channel_Driver
9 <https://wiki.allstarlink.org/wiki/VOTER-Simulcasting>
10 <https://wiki.allstarlink.org/wiki/VOTER-Buffers>
11 https://wiki.allstarlink.org/wiki/Quantar_RTCM
12 <https://wiki.allstarlink.org/index.php?title=User:VE7FET&action=edit&redlink=1>
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7 Contributors

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Version 3, 29 June 2007

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