

What is the difference between
VARA FM NARROW and VARA FM WIDE

Deriving the VARA FM Winlink Baseband Audio Bandwidth

Baseband Audio BW = (symbol rate) x (number of carriers)

- The bandwidth of the modulated audio carrier is approximately = symbol rate
- VARA FM NARROW Level 11
 - There are 58 modulated audio carriers being transmitted simultaneously during a message transmission.
 - The 58 carriers are Orthogonally Frequency Division Multiplexed (OFDM) together.
- Level 11 Baseband Audio BW $\approx$ 2500 Hz
- Baseband Audio BW = 42 Hz x 58 carriers
- Baseband Audio BW = 2436 Hz
- Maximum VARA FM NARROW Baseband BW with guard band on the left and right will be approximately 2500 Hz

VARA FM Speed Table

Level	VARA FM WIDE				VARA FM NARROW			
	Symbol Rate	Carriers	Mod.	Net Rate (bps)	Symbol Rate	Carriers	Mod.	Net Rate (bps)
1	42	14	4PSK	566	42	14	4PSK	566
2	42	29	4PSK	1188	42	29	4PSK	1188
3	42	58	4PSK	2390	42	58	4PSK	2390
4	42	98	4PSK	4040	42	58	4PSK	3188
5	42	98	4PSK	5387	42	58	8QAM	4252
6	42	98	8QAM	7185	42	58	16QAM	5668
7	42	98	16QAM	9580	42	58	32QAM	7087
8	42	116	16QAM	11340	42	58	64QAM	8505
9	42	116	32QAM	14144	42	58	64QAM	9567
10	42	116	64QAM	16932	42	58	128QAM	11162
11	42	116	64QAM	19003	42	58	256QAM	12750
12	42	116	128QAM	22102				
13	42	116	256QAM	25210				

Deriving the VARA FM Winlink Baseband Audio Bandwidth

Baseband Audio BW = (symbol rate) x (number of carriers)

- The bandwidth of the modulated audio carrier is approximately = symbol rate
- VARA FM WIDE Level 13**
 - There are 116 modulated audio carriers being transmitted simultaneously during a message transmission.
 - The 116 carriers are Orthogonally Frequency Division Multiplexed (OFDM) together.
- Level 13 Baseband Audio BW $\approx$ 5000 Hz
- Baseband Audio BW = 42 Hz x 116 carriers
- Baseband Audio BW = 4872 Hz
- Maximum VARA FM WIDE Baseband BW with guard band on the left and right will be approximately 5000 Hz

VARA FM Speed Table

Level	VARA FM WIDE				VARA FM NARROW			
	Symbol Rate	Carriers	Mod.	Net Rate (bps)	Symbol Rate	Carriers	Mod.	Net Rate (bps)
1	42	14	4PSK	566	42	14	4PSK	566
2	42	29	4PSK	1188	42	29	4PSK	1188
3	42	58	4PSK	2390	42	58	4PSK	2390
4	42	98	4PSK	4040	42	58	4PSK	3188
5	42	98	4PSK	5387	42	58	8QAM	4252
6	42	98	8QAM	7185	42	58	16QAM	5668
7	42	98	16QAM	9580	42	58	32QAM	7087
8	42	116	16QAM	11340	42	58	64QAM	8505
9	42	116	32QAM	14144	42	58	64QAM	9567
10	42	116	64QAM	16932	42	58	128QAM	11162
11	42	116	64QAM	19003	42	58	256QAM	12750
12	42	116	128QAM	22102				
13	42	116	256QAM	25210				

VARA FM Winlink Data Communications

Frequency Deviation

- The F_{dev} for VARA FM NARROW should not exceed 5 kHz
- The F_{dev} for VARA FM WIDE should not exceed 3 kHz

Radio Configuration to accommodate VARA FM NARROW Data Communications

- VARA FM NARROW can be supported by amateur radio transceivers that do not have a dedicated data port.
- The transmitted audio coming from the analog side of the soundcard is injected into the radio's microphone jack.
- The radio's external speaker jack is the source of the receive audio that is injected into the analog side of the soundcard.

Radio Configuration to accommodate VARA FM NARROW Data Communications

- The radio is typically configured for 1200 bps operation
- This does not mean that the VARA FM NARROW data rates are limited to 1200 bps. It is a naming convention carry over from Packet Radio.
- The 1200 bps configuration means the radio is using circuitry that limits the audio bandwidth to 3 kHz

The VARA Terminal Node Controller Configuration to accommodate VARA FM NARROW

VARA Setup 127.0.0.1

TCP Ports:
Command: 8300
Data: 8301

FM System: NARROW

Digipeater:

Retries: 3

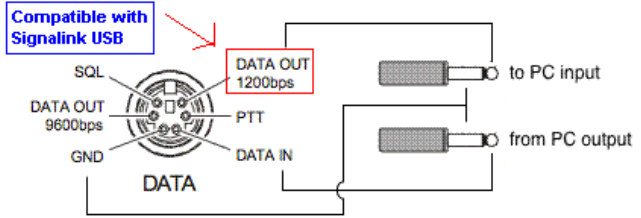
☒ Allow VARA check for updates

☐ KISS interface ☐ SysLog

VARA Licenses

Callsign:	Registration Key:
KC5RUO	XXXXXXXXXXXXXXXXXXXX
NM5BC	XXXXXXXXXXXXXXXXXXXX

Compatible with Signalink USB



* VARA FM WIDE needs a FM rig set for 9600 Packet operation, with a special soundcard interface (6 kHz BW) connected to rear panel: RA-Board, Signalink "Black" transforms, Modified Signalink (red audio transforms removed), homebrew interface (a simple direct cable)...

* In other case, you must select VARA FM NARROW

Close

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Notes

95°F

23:39 7/28/2026

Radio Configuration to accommodate VARA FM WIDE Data Communications

- VARA FM WIDE can only be supported by amateur radio transceivers that have a dedicated data port
- The data port bypasses the microphone input circuitry which limits the audio bandwidth to 3 kHz and probably injects the data signal right into the pre-emphasis section of the transmitter chain
- On the receive side the received signal is taken from the output of the discriminator before it gets to the audio amplifier section of the receiver chain so as not to limit audio bandwidth of the receive signal.

Radio Configuration to accommodate VARA FM WIDE Data Communications

- You need a 9600 bps capable transceiver in order to use VARA FM WIDE
- The 9600 bps selection means the radio will permit audio bandwidth up to 6 kHz
 - Either VARA FM NARROW or VARA FM WIDE can be used when radio is configured for 9600 bps
 - The 9600 selection does not mean the VARA FM NARROW or VARA FM WIDE data rate is limited to 9600 bps. The 9600 is a naming convention carry over from Packet Radio

The VARA Terminal Node Controller Configuration to accommodate VARA FM WIDE

The image shows a Windows desktop with several applications open. The primary focus is the 'VARA Setup' dialog box, which is titled '127.0.0.1'. It contains the following sections:

- TCP Ports:** Command (8300) and Data (8301).
- FM System:** A dropdown menu set to 'WIDE'.
- Digipeater:** An empty text field.
- Retries:** A dropdown menu set to '3'.
- Checkboxes:** 'Allow VARA check for updates' (checked), 'KISS interface' (unchecked), and 'SysLog' (unchecked).
- VARA Licenses:** A table with three rows for license configuration.

Callsign:	Registration Key:
KC5RUO	[Redacted]
NM5BC	[Redacted]
[Redacted]	[Redacted]

Below the settings is a diagram of a radio's rear panel. It shows a circular connector with pins labeled: SQL, DATA OUT 1200bps, PTT, DATA IN, DATA, and GND. A blue box highlights the text '42 baud Symbol Rate Legal on 2 meters band'. A red box highlights 'DATA OUT 9600bps'. Wires connect the DATA OUT 1200bps pin to 'to PC input' and the DATA IN pin to 'from PC output'.

* VARA FM WIDE needs a FM rig set for 9600 Packet operation, with a special soundcard interface (6 kHz BW) connected to rear panel: RA-Board, Signalink "Black" transforms, Modified Signalink (red audio transforms removed), homebrew interface (a simple direct cable)...

* In other case, you must select VARA FM NARROW

At the bottom of the dialog is a 'Close' button.

In the background, the 'Winlink' application is visible. It shows a 'Source' table with the following data:

Source	Sender	Recipient	Subject
SMTP	SMTP:jfnihart...	KC5RUO	Re: ICS-213: status report - 2026-07-25
KM5GH	KM5GH	KC5RUO...	ICS-213: Request - 2026-07-25 14:20
KM5GH	KM5GH	KC5RUO	CLASS TEST

Below the table is a large green rectangular area, likely a display for a message or image. At the bottom of the Winlink window are two semi-circular gauges labeled 'TX Delay' and 'S/N'. Below these are buttons for 'NARROW', 'TCP' (with a green dot), and 'DCD' (with a green dot). The Windows taskbar at the bottom shows the time as 23:22 on 7/28/2026, with a temperature of 95°F.