How to Use an Antenna Analyzer

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How to Use an Antenna Analyzer

• The basics
  – Impedance
  – Reactance
  – Resistance
  – SWR
  – Efficiency and SWR
  – Use in conjunction with EZNec for “the rest of the story” . . .
How to Use an Antenna Analyzer

• Why use an antenna analyzer?
  – Avoid “costly” mistakes when pruning
  – Check your antenna against mfg. published specs
  – Tune antenna
  – Tune feedline
  – Tune phasing “stubs”
  – Troubleshoot problems
  – Education – “demystify” your antenna system
  – See if an antenna tuner will have the range you need
  – See if you are expecting too much from an antenna
    and re-adjust your strategy based on hard facts
How to Use an Antenna Analyzer

PALSTAR ZM-30

MFJ 269
How to Use an Antenna Analyzer

PALSTAR ZM-30 – comes with ladder line transformer and XXXXXXX
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Both Can Measure:

• Antenna bandwidth (SWR across frequency)
• Feedpoint impedance
• Ground loss
• Coax cable loss
• Adjust tuners and amp tuned circuits and measure loss
• Measure phasing lines
• Impedance of transmission lines
• Measure balun loss
• Inductor Q
• Magnetic loop resonance and SWR
How to Use an Antenna Analyzer

• Major Differences
  – MFJ-269
    • Covers VHF and UHF
    • Line length in degrees and feet
  – Palstar ZM-30
    • Has Serial port and can scan from PC
    • Has better battery access and feels more stable
      and “solid” as far as build quality is concerned
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• MFJ features
• Palstar features
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• Monoband Antennas
  – Full sized monoband antennas will be more broadbanded
  – Shortened monoband antennas will be more narrow banded
  – The SWR and Reactance curves will be “simpler” and “more predictable” for a properly working monoband antenna
  – Full sized monoband antennas offer less of a “compromise” solution
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• Multiband Antennas
  – Usually more narrow band than a full sized monoband antenna
  – Require special tuned circuits (L – C components or design of the radiators to achieve the same effect)
  – Have very complex SWR and reactance curves
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• Tuning feedlines
  – Coax length and resonance
  – Ladder line
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• Arrays and tuning “stubs”
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- Multiband Dipole – Alpha Delta DX-LB
  - 20 kHz on 160M
  - 40 kHz on 80M
  - 300 kHz on 40M
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• Multiband Dipole – Alpha Delta DX-LB
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- DX-LB on 160M
  - Matches manufacturers specs – 20 khz bandwidth on 160M

BTW – had to write down data point readings by hand and enter them in Excel
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- DX-LB on 80M
  - As advertised, 40 khz bandwidth on 80M
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• DX-LB on 40M
  – Also as advertised on 40M - 300 khz bandwidth
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- Force-12 “Ruby” 2M / 70CM SHVD
  - Advertised bandwidth of 1.4:1 for more than 20 mhz
    - I verified that this is true with my MFJ-269 analyzer
    - I found that performance wise (simplex 2M QSO between Lafayette and Petaluma) it is “comparable” to my Diamond X50. It is half the size and built like a tank. You could stack these vertically more easily than an X50.
How to Use an Antenna Analyzer

- **K9AY Loops – Receive Only Antenna**

![Diagram of K9AY Loops Antenna](image)
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• K9AY Loops – Receive Only Antenna
  – Wanted to see if the terminating resistor really did affect the SWR, since you are changing the antennas impedance
  – It does – but very subtly – 10 positions that range from 1.1:1 to 1.7:1
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• Cutting Phasing Lines / Stubs
• Tune radials
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- Force-12 C3SS – Automatically Scanned & Plotted for 20M
Ma8040v – 80M
Ma8040v – 40m
Ma8040v – 1 -10mhz
Ma8040v – 10 – 20 mhz
Ma8040v – 20 -30 mhz
Dx-lb 160
Link 908

Micro908 ↔ PC Control Link Software

Graph Controls
- SWR
- Resistance
- Reactance

Display
- All

Frequency Band
- 80 Mtrs

Data Points
- 500

Program Controls
- Remote Control
- Exit

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Dx-Ib 40m