AEA Technology, Inc.

VIA Echo

Versions 4.X or higher

Quick Start Guide

This is a generalized Quick Start Guide that is applicable to all Models of VIA Echo. Major differences between models are noted.

AEA Technology’s VIA Echo series instruments are Vector Impedance Analyzers with a wide frequency range:

VIA Echo 1000 & 1000SF – 4MHz to 1.0GHz

VIA Echo 2500 – 4MHz to 2.5GHz

VIA Echo MRI – 4MHz to 1.0GHz

They are designed to present 2 of 12 testing parameters at a time on their LCD, store, and upload all 12 to a PC using Echo PC Vision. They operate in swept frequency or CW mode and have cable nulling to eliminate the cable’s influence on an antenna under test. The Echo 1000SF & 2500 models also have a Spectrum Analyzer and an FDR (Frequency Domain Reflectometer). The MRI model is designed for testing Magnetic Resonance coils (MRI or NMR) and is ultra-low magnetic.

Before you start

1. **Read all operating precautions in the Operations Manual**
2. All Echo’s except the MRI model are equipped with NiMH batteries. Recharging prior to use is recommended. See Battery Menu – F4 key. MRI models use a sealed lead acid battery.
3. Is a transmission cable involved? If yes, see “Cable Nulling” feature.
4. Operate stand-alone or connected to a PC? If PC operated, install Echo PC Vision, connect the USB cable, turn on the Echo and wait for the measurement screen, then double-click the PC Vision icon on your PC.

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VECTOR IMPEDANCE ANALYZER Mode

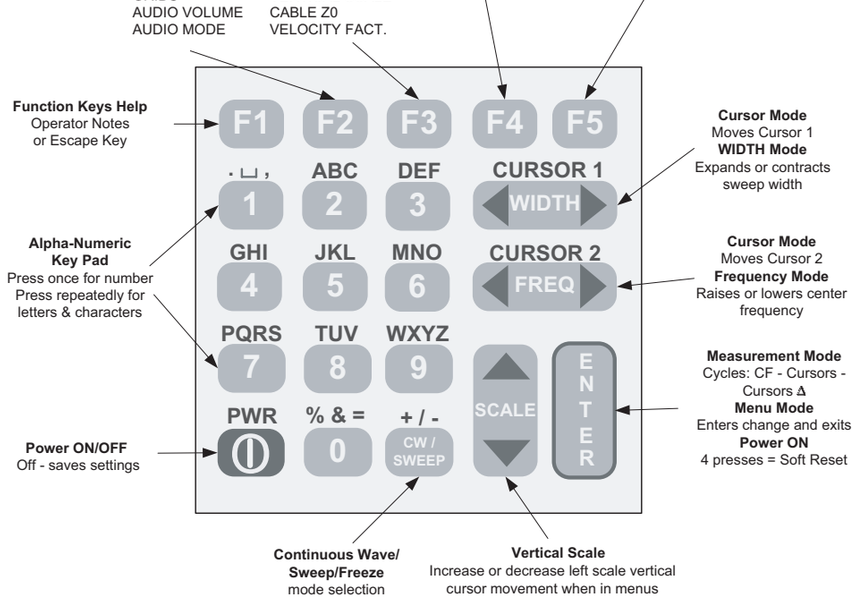
F2-AUDIO/VIDEO	F3 PLOT SETTINGS	F4 SPECIAL FUNCTIONS	F5 MEMORY OPERATIONS
BKLIGHT TIMER	INSTRMENT MODE	VIDEO FILTER	
BRIGHTNESS	CENTER FREQ	AVERAGING FLTR	DATA SAVE
CONTRAST	SWEEP SPAN	SEARCH MODE	DATA RECALL
VIDEO INV	LEFT PLOT TYPE	3RD CRSR VALUE	SAVE SETTINGS
PERSISTENCE	RT. PLOT TYPE	SERIES PARLLEL	RECALL SETTINGS
GRIDS/LIMITS	LEFT SCALE	CABLE NULL	
AUDIO VOLUME	RIGHT SCALE	BATTERY MENU	
AUDIO MODE	SYSTEM Z0	DATE/TIME SET	

SPECTRUM ANALYZER Mode (Selected Models)

F2-AUDIO/VIDEO	F3 PLOT SETTINGS	F4 SPECIAL FUNCTIONS	F5 MEMORY OPERATIONS
BKLIGHT TIMER	INSTRMENT MODE	VIDEO FILTER	
BRIGHTNESS	CENTER FREQ	AVERAGING FLTR	DATA SAVE
CONTRAST	SWEEP SPAN	SEARCH MARKER	DATA RECALL
VIDEO INV	REF LEVEL	DEMODULATOR	SAVE SETTINGS
PERSISTENCE	RESOLUTION BW	BATTERY MENU	RECALL SETTINGS
GRIDS	VERTICAL SCALE	DATE/TIME SET	
AUDIO VOLUME	EXT. MODULES		
AUDIO MODE	DISPLAY FORMAT		

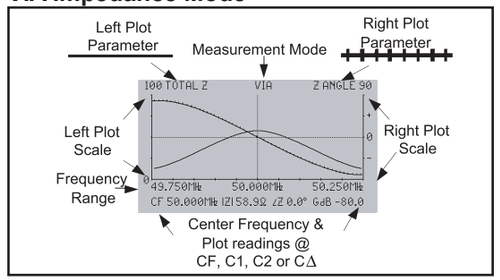
FREQUENCY DOMAIN REFLECTOMER Mode (Selected Models)

F2-AUDIO/VIDEO	F3 PLOT SETTINGS	F4 SPECIAL FUNCTIONS	F5 MEMORY OPERATIONS
BKLIGHT TIMER	INSTRMENT MODE	VIDEO FILTER	
BRIGHTNESS	CENTER FREQ	AVERAGING FLTR	DATA SAVE
CONTRAST	PLOT LENGTH	SEARCH MODE	DATA RECALL
VIDEO INV	LENGTH UNITS	BATTERY MENU	SAVE SETTINGS
PERSISTENCE	VERTICAL MODE	DATE/TIME SET	RECALL SETTINGS
GRIDS	VERTICAL SCALE		
AUDIO VOLUME	CABLE Z0		
AUDIO MODE	VELOCITY FACT.		

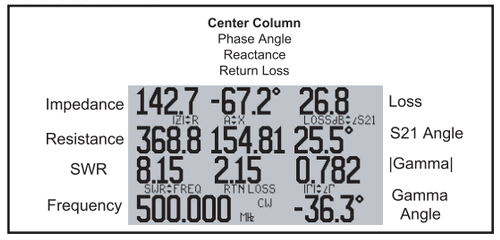


VIA Echo Displays

VIA Impedance Mode

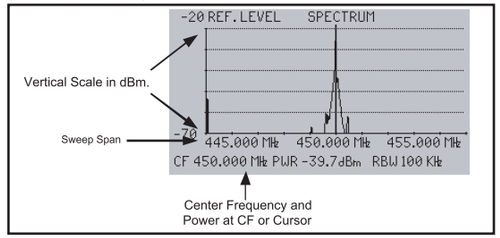


VIA CW Mode



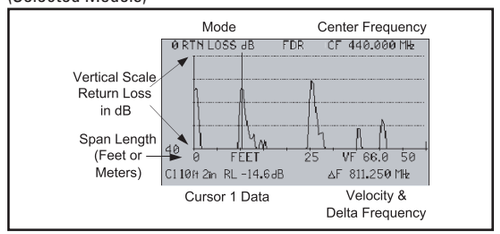
Spectrum Analyzer Mode

(Selected Models)



Frequency Domain Reflectometer Mode

(Selected Models)



FOLD

Vector Impedance Analyzer

Basic Testing Steps

1. Press PWR to turn ON the Echo & wait for Measurement Screen to appear. Five minute warm up is highly recommended.

2. Press F3 and set: [▲▼ to select]
   INSTRUMENT MODE: ◀▶ to **VIA**
   CENTER FREQ: ◀▶ Keypad enter
   SWEEP SPAN: ◀▶ to preset width
   LEFT PLOT TYPE: ◀▶ to preset
   RT. PLOT TYPE: ◀▶ to preset
   LEFT SCALE: ◀▶ to preset
   RIGHT SCALE: ◀▶ to preset
   SYSTEM Z0: ◀▶ Keypad enter

3. Press ENTER to accept and exit to Measurement Screen & note readings

NOTE: If antenna is not a direct connection, see the "Cable Nulling" instructions prior to next step.

4. Connect the antenna to the S11 connector. (If required, connect 2nd antenna to the S21 port)

Measurement Screen Direct Controls

Entering a number via the keypad permits direct entry of: Center Frequency (CF), Step Size or Sweep Span.
Enter the desired value and follow prompts on screen.

Press WIDTH for Sweep Span

Press FREQ for Step Size

Press ENTER for Center Frequency

Also

Cycle ENTER key: **CF > Cursors > Cursor Δ**

In CF - WIDTH changes Sweep Span

and FREQ change Step Size.

Vector Impedance Analyzer

(Continued)

In **Cursors** WIDTH moves **Cursor 1** and FREQ moves **Cursor 2**
In **Cursor** Δ both the cursors and the difference between the cursors are displayed

Cable Nulling

The higher the antenna frequency the more important cable nulling is to eliminate skewed measurements. Even short cables should be nulled from the measurements.

1. Follow Testing Steps 1 through 3 down to Cable Nulling. Then select CABLE NULLING: ON

2. Follow the screen prompts to connect the OPEN, SHORT & MATCHED terminators, then connect the far-end to the S21 port for THRU path. This will characterize the cable and store the data.

3. Press ENTER to accept and exit to the Measurement Screen. All the readings for the antenna are now only for the antenna as the cable's effects have been removed. Now proceed using the Measurement Screen Direct Controls section.

NOTE: Once Cable Nulling is complete changing Sweep, Width, or Center Frequency will trigger a new Cable Null cycle.

Continuous Wave (CW)

CW mode is best for antenna tuning as it provides faster results without the delay for swept frequencies.
Also, all measurement types are displayed at once.

1. Press the + / - CW / SWEEP key once to go from SWEEP and once more to go from FREEZE PLOT to the CW mode.

This action will stop the frequency sweep and only use a single frequency (CF). All other key actions work as listed before. Note: To quickly switch between CF and cursor frequencies press ENTER

Using S11 and S21 Ports

S11 measures impedance of a load, S21 measures the isolation between antennas or measures gain or loss in networks. NOTE: to save data from both test ports one plot (left or right) must be S11 and the other S21.

Follow the steps for Cable Nulling and Basic Testing as required.

Spectrum Analyzer (SA)

(Selected Models)

Basic Testing Steps

1. Connect the antenna to the S21 connector.

2. Press PWR to turn ON the Echo & wait for Measurement Screen to appear.

3. Press F3 and set: [▲▼ to select]
   INSTRUMENT MODE: ◀▶ **SPECTRUM**
   CENTER FREQ: ◀▶ Keypad enter
   SWEEP SPAN: ◀▶ to preset width
   REF LEVEL: ◀▶ to preset
   RESOLUTION BW: ◀▶ to preset
   VERTICAL SCALE: ◀▶ to preset
   EXT. MODULES: ◀▶ ATTN or PREAMP
   DISPLAY FORMAT ◀▶ SPEC. or PWR MTR

4. Press ENTER to accept and exit to Measurement Screen & note readings

Measurement Screen Direct Controls

Same as VIA

Frequency Domain Reflectometer (FDR)

(Selected Models)

Testing Steps

1. Connect the cable to the S11 connector.

2. Press PWR to turn ON the Echo & wait for Measurement Screen to appear.

3. Press F3 and set: [▲▼ to select]
   INSTRUMENT MODE: ◀▶ to FDR
   CENTER FREQ: ◀▶ Keypad enter
   PLOT LENGTH: ◀▶ Keypad enter
   NOTE: Always set this length longer than the cable
   LENGTH UNITS: ◀▶ FEET or METERS
   VERTICAL MODE: ◀▶ RETURN LOSS or SWR
   VERTICAL SCALE: ◀▶ to preset
   CABLE Z0: ◀▶ Keypad enter 10 to 100 Ohms
   VELOCITY FACT.: ◀▶ Keypad enter .20 -.99c

4. Press ENTER to accept and exit to Measurement Screen & note readings

Measurement Screen Direct Controls

Same as VIA

Important Testing Information

1. Use Cable Null to attain the best accuracy, particularly for frequencies > 500 MHz.

2. Allow unit to warm for ~5 minutes prior to measuring for optimum accuracy in the Vector Testing Analyzer mode.

3. If a recalibration or Cable Null is desired press WIDTH up, WIDTH down.

Power Information

The Via Echo hand-held models come with 8 AA NiMH batteries installed. The VIA Echo MRI comes with a sealed lead-acid battery. To recharge either connect the AC wall adapter to 120/240 VAC 50/60Hz and plug in the DC plug at the instrument's jack. The Charging Status LED will indicate as follows:

LED	Echo – NiMH batteries	Echo MRI – Lead Acid
Off (dark)	Not recharging	Not recharging
Flashing Red	Battery Check	Battery Check
Solid Red	Charging	Charging
Flashing Green	Trickle Charge	Float Charge
Solid Green	Fully Charged	Fully Charged

Detailed battery and charging status is also available by pressing the F4 key and selecting the BATTERY MENU. Hand-held Echo's can operate on AA alkaline cells if the NiMH cells are not charged and no AC power is available. If used, select BATTERY MENU, go to BATTERY TYPE and select ALKALINE to disable the charger. All 8 AA cells must be of the same type.