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# 429HBA Hand Held

## Bus Analyzer




- RUGGED, HAND HELD, MOISTURE RESISTANT
- SOPHISTICATED TRIGGERING
- 4K RECORD BUFFER WITH TIME STAMP
- 8K TRANSMIT BUFFER
- DATA RAMPING
- CABLE TEST MODE
- SUPPORTS 429-11, 737-AVM, 737-FQIS, 757-EICAS, 757-EIS, 757-FSEU, AND USER DEFINED LABLES
- 8-12 HOUR CONTINUOUS OPERATION ON A SINGLE CHARGE
- NON-VOLATILE SYSTEM STORAGE
- PRINTER AND HOST COMPUTER SUPPORT

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## BENCH TOP POWER AT YOUR FINGERTIPS

The Interface Technology 429HBA is the first ARINC 429 bus analyzer that packs bench top power into a hand held instrument. Designed for use in the lab or on the flight line, the sophisticated features found in this rugged, lightweight instrument provide engineers and technicians with a powerful diagnostic tool for identifying problems with 429 avionics.




**The Master Menu shows the four basic operating modes, Transmit, Receive (Monitor), Cable Test, and Utility. (screen shown approximately actual size)**

## SYSTEM CHARACTERISTICS

- User friendly, menus
- Sealed ABS plastic case within a protective outer rubber case
- 8-7/8" x 4-3/8"
- Weighs less than 3 pounds
- Moisture resistant
- 256K non-volatile RAM, 256K volatile RAM, 256K operating system
- 68000 microprocessor
- Supports the Mark 33 Digital Information Transfer System

## FLEXIBLE DATA ENTRY AND DISPLAY

- Full ARINC 429-11 label definitions
- Display data in hex, binary, discrete, or engineering units
- Interprets Boeing 757 Flap/Slat Electronic Unit (FSEU), Engine Indicating and Crew Alerting System (EICAS), and Engine Indicating System (EIS) labels
- Interprets Boeing 737 Avionics Vibration Monitoring (AVM) and Fuel Quantity Indicating System (FQIS)

## POWERFUL BUS MONITORING

- 32K byte record buffer stores 4K labels
- Time stamp is recorded with every label
- Pre-trigger records all bus activity up to and including the trigger event
- Post-trigger starts recording when the trigger event is detected on the bus and stops when memory is full
- Triggers when data is less than, equal to, or greater than a specific value. Also triggers on specific bit patterns with bit masking
- Continuous mode dynamically updates the display with fresh data while recording data to the record buffer
- Filtered record selectively records data from the bus, ignoring data that does not match the filter criteria




**Four trigger modes may be used to capture specific bus traffic; Pre-trigger, Post-trigger, Continuous, and Filtered record.**




**Each label recorded from the bus is stored with a time tag. Data may be scrolled using the cursor keys.**

## VIRTUAL LABELS

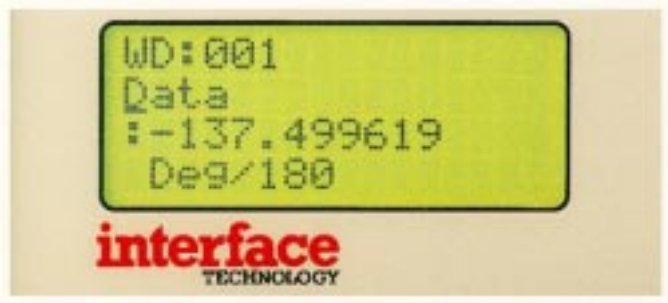
- User defined labels
- Field programmable label sets
- Control label descriptions to the bit level

## EXTENSIVE TRANSMIT CAPABILITY

- 32K byte transmit memory holds 8K labels and data
- 16 labels with individual 2K byte partitions
- 512 data words per label partition
- Dynamic data update
- Data ramping for BNR labels provides realistic simulation of flight data
- 16 ramp legs per label partition
- 0.5 to 1024 second ramp period for each ramp leg




**Transmit menu shows one of 16 labels defined as label 107 with a 60 ms update rate of 512 words of data.**




**Word number one from the above example is programmed with a data value of -137.499619 degrees of angle. Up to 511 more data values may be entered.**

## EXTENDED CAPABILITIES

- Cable test mode identifies faulty and intermittent busses
- Built-in diagnostics provide capabilities for:
  - – ARINC 429 wrap-around test
  - – RS-232 wrap-around test
  - – Combination keyboard/display test
  - – Full system memory test

## POWER MANAGEMENT

- High capacity batteries provide 8-12 hours of continuous operation
- Operating time extended with use of power saver features
- Low battery detection circuit provides 2 minute warning before automatically saving system configuration to non-volatile RAM
- Non-volatile RAM stores complete configuration, label definitions, and recorded bus traffic ANY TIME you turn off power
- Lithium back-up battery saves configuration even after main battery is removed
- Power saver shuts down system after user defined period of inactivity
- Battery charger doubles as AC power source for unlimited operating time
- Low power 4 line by 16 character backlit LCD display
- Software switch enables or disables LCD backlight
- User may adjust LCD contrast for optimum viewing angle




**The RS-232 port may be used to upload new label definitions, save system configurations, load system configurations, or print data to a pinter or host computer.**

## HOST AND PRINTER SUPPORT

- Optional application software allows user to:
  - Define and download custom/extended label sets
  - Upload complete system configurations
  - Download complete system configurations
  - Create libraries of test files for each system or aircraft
  - Print captured bus traffic to host computer for display or archive
- Optional portable battery operated dot matrix printer allows printing of captured bus traffic or transmit data

# Specifications

## System

| | |
|---|---|
| **Weight**: | 2.8 lbs |
| **Dimensions** | |
| Length: | 8.875” |
| Width: | 4.375” |
| Depth: | 2.438” |
| **Temperature** | |
| Operating: | 0º C to 50º C |
| Non-operating: | -10º C to 60º C |
| **Power** | |
| Battery: | 8-12 hours continuous operation |
| Power-save: | 1-99 minutes, disabled |
| AC: | 110 Vac/220 Vac |
| **Processor:** | 68000 |
| **LCD Display:** | Backlit 4 lines by 16 characters |
| **Non-volatile RAM**: | 256 Kbytes |
| **EPROM** | 256 Kbytes |
| **System RAM:** | 256 Kbytes |

## Transmitter

| | |
|---|---|
| **Channels:** | Single |
| **Transmit Rate:** | |
| Low Rate: | 12.5 Kbps |
| High Rate: | 100 Kbps |
| **Rise/Fall Time** | |
| Low Rate: | 10 µs ±5 µs |
| High Rate: | 1.5 µs ±0.5 µs |
| **Parity:** | Selectable odd or even |
| **Output Amplitude:** | ±10 V |
| **Output Impedance:** | 70-80 ohms |
| **Update Reate:** | Selectable 1 ms to 65,535 ms, 1 ms steps |
| **Transmit Memory:** | 32 Kbytes (8K labels) |
| **Labels:** | 16 transmit labels |
| **Data:** | 512 data words per label |
| **Ramping:** | BNR labels, 16 legs per label |
| **Ramp Period:** | 0.5-1024 seconds, 0.5 second steps |

## Receiver

| | |
|---|---|
| **Channels:** | Single |
| **Receive Rate** | |
| Low Rate: | 12.5 Kbps |
| High Rate: | 100 Kbps |
| **Input Sensitivity:** | ±6.7 V to ±13.0 V |
| **Input Impedance:** | 12k ohms |
| **Parity:** | Selectable odd or even |
| **Receive Memory:** | 32 Kbytes (4K labels) |
| **Time Tag:** | 24-bit count, 250 µs resolution |
| **Trigger Modes:** | Pre-trigger<br>Post trigger<br>Continuous record<br>Filtered Record |



**The HBA shown with options 429-002/, -004, -005 and -008.**

| | |
|---|---|
| 429-001 | Extra Operator’s Manual. |
| 429-002 | Spare 110 Vac Power Source and Battery: Additional combination 110 Vac power source/battery charger, and spare long-life, high capacity battery pack. |
| 429-003 | Spare 220 Vac Power Source and Battery: 220 Vac version of option 429-002 above. |
| 429-004 | Additional Test Lead Set:<br>Additional transmit and receive interconnedt cable. Each color coded cable comes with mating connector and ball clips. |
| 429-005 | Application software and Diagnostics Kit: Provides complete upload/download capability of instrument set up to any MS-DOS compatible computer. Also allows the user to define a custom label data base and download it to the 429HBA using the supplied 429HBA to host RS-232C interface cable. The diagnostics kit consists of an ARINC 429 transmit/receive and RS-232C wrap-around cable for use when running the internal self-test |
| 429-006 | Battery Operated RS-232C Printer (110 Vac): A portable battery operated dot matrix printer. May be used to print captured bus traffic or transmit data. Comes with an extra ribbon, extra spool of paper, battery, 110 Vac adapter/battery charger, RS-232C interconnect cable, and manual. |
| 429-007 | Battery Operated RS-232C Printer (220 Vac): 220 Vac version of option 429-006 above. |
| 426-008 | Yellow Rubber Case: A Flight Line Yellow rubber case may be substituted for the standard Interface gray case. |

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