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- **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 LABELS**
- **8-12 HOUR CONTINUOUS OPERATION ON A SINGLE CHARGE**
- **NON-VOLATILE SYSTEM STORAGE**
- **PRINTER AND HOST COMPUTER SUPPORT**

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 printer 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:	0° C to 50° C
Non-operating:	-10° C to 60° 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 μ s \pm 5 μ s
High Rate:	1.5 μ s \pm 0.5 μ s
Parity:	Selectable odd or even
Output Amplitude:	\pm 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:	\pm 6.7 V to \pm 13.0 V
Input Impedance:	12k ohms
Parity:	Selectable odd or even
Receive Memory:	32 Kbytes (4K labels)
Time Tag:	24-bit count, 250 μ s resolution
Trigger Modes:	Pre-trigger Post trigger Continuous record 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: Additional transmit and receive interconnect 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.

interface
TECHNOLOGY



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