

DD-42999S0

## Commercial Avionics Utilities Software Suite

Make sure the next Card you purchase has...



### FEATURES

- Simple-to-Use Windows Interface
- Supports Windows® 95/98/2000 and Windows NT®
- Compatible with DDC's hardware: PCI, ISA, PCMCIA, PMC, VME(MXI), and cPCI
- One Convenient Package Includes ARINC 429 Data Bus Analyzer and ARINC 615 Data Loader
- For Your Avionics Testing, Simulation and Monitoring Needs

The DD-42999S0 Commercial Avionics Utilities Software Suite is DDC's advanced, easy-to-use, Windows based software application solution when interfacing to commercial avionics systems. This PC-based software package provides complete data analysis and testing tools for use within Windows 95/98/2000 and Windows NT systems.

### ARINC 429 Data Bus Analyzer

The ARINC 429 Data Bus Analyzer software is the perfect analysis and simulation design tool. When combined with one of DDC's hardware cards, the ARINC 429 Data Bus Analyzer provides flexibility for the capture, simulation, manipulation, and display of ARINC data on the bus.

### ARINC 615 Data Loader

This software application provides all the functionality of a portable ARINC 615 Data Loader. When combined with one of DDC's hardware cards, the ARINC 615 Data Loader can be used to upload and download information to and from ARINC 615 compatible devices.

#### FOR MORE INFORMATION CONTACT:

Technical Support:  
1-800-DDC-5757 ext. 7234



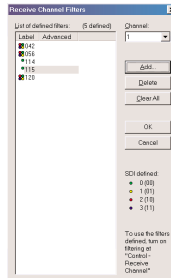
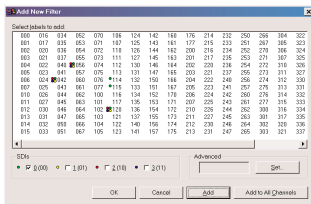
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[www.ddc-web.com](http://www.ddc-web.com)

ARINC 429 Data Bus Analyzer...  
Making Data Analysis Easier.

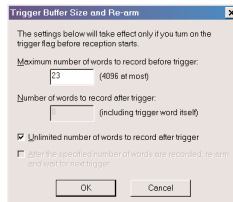
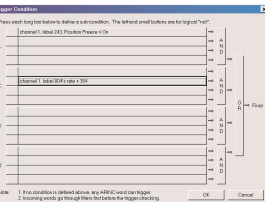


Chan	Ch	Alias	Eq.	Eq. No.	La.	S.	Row Data	P	Abs. Ti	Rel. Time	Ty.	SSM	Parameter Name	Value	Unit
1	1				001	01	000001	E	49.74 sec	49.74 sec		00			
2	1				300		800001	E	51.73 sec	2.00 sec		00	Data Loader Address Label (Low Speed)		
3	1				300		1800001	E	53.73 sec	2.00 sec		00	Data Loader Address Label (Low Speed)		
4	1				001	01	000001	E	55.73 sec	2.00 sec		00			

Filtering Incoming Data



Capture Events



Built-in Engineering Data Base

Equipment ID

Labels for Equipment

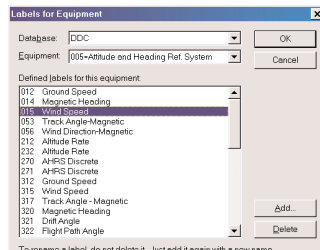
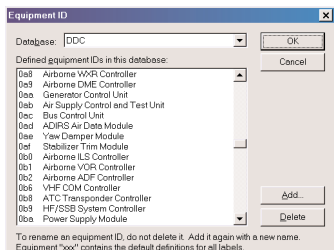


FIGURE 1. ARINC 429 DATA BUS ANALYZER

ARINC 615 DATA LOADER

- Turns a PC/Laptop and an ARINC 429 card into an ARINC 615 data loader.
- Loads from floppy or hard disk drive.
- Loads from single or multiple disk load sets.
- Provides protocol analysis features.
- Single-user or Administrated multi-user modes.
- Supports automatic and control modes.
- Provides discrete output triggering capabilities.

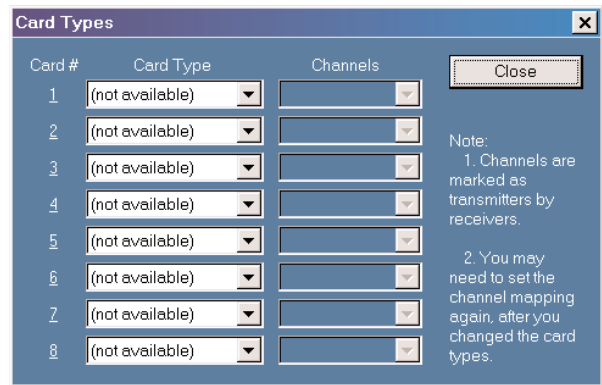
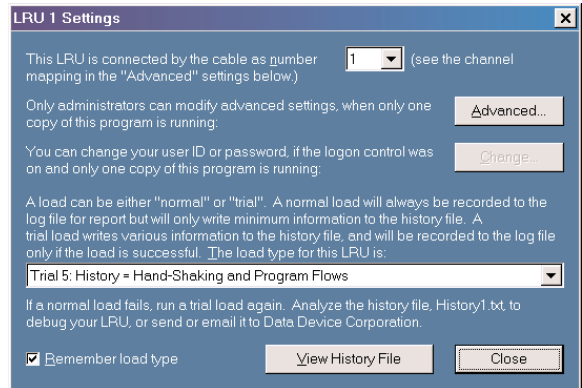
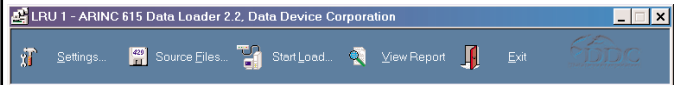


FIGURE 2. ARINC 615 DATA LOADER



# DD-42999S0 ARINC 429 DATA BUS ANALYZER

## FEATURES

Num	Ch	Alias	Eq	Eq. No.	La.	S.	Raw Data	P	Abs. Tl	Rel. Time	Ty.	SSM	Parameter Name	Value	Unit
1	1				355	800000	0	0.0 msec	0.0 msec	AS	00	00	Acknowledgement	<NUL><NUL><NUL>	
2	1				355	800000	0	0.0 msec	0.0 msec	AS	00	00	Acknowledgement	<NUL><NUL><NUL>	
3	1				371	00 800000	0	0.0 msec	0.0 msec	ENR	failure		General Aviation Eq.	EO Code=0 Company=0 Company's Date=0	
4	2				356	800000	0	0.0 msec	0.0 msec	AS	00	00	Maintenance ISO #5	<NUL><NUL><NUL>	
5	4				226	800000	0	0.0 msec	0.0 msec			00	Data Loader Address		
6	2				226	800000	0	0.0 msec	0.0 msec			00	Data Loader Address		
7	2				226	800000	0	0.0 msec	0.0 msec			00	Data Loader Address		
8	2				226	800000	0	0.0 msec	0.0 msec			00	Data Loader Address		
9	2				243	00 800000	0	0.0 msec	0.0 msec	Disc			Simulator to Avionic...	Flight Freeze=Off Position Freeze=Off Altitude Freeze=Off Fuel Freeze=Off Position Set=Off Position Slew=Off Altitude Slew=Off Airspeed Slew=Off Heading Slew=Off Snap Shot Take=Off Snap Shot Recall=Off Speed Times Hi=Off Zero Fuel Weight Set=Off Fuel Weight Set=Off Temperature/Pressure Set=Off Aircraft Reposition=Off Wind Set=Off	
10	2				243	00 800000	0	0.0 msec	0.0 msec	Disc			Simulator to Avionic...	Flight Freeze=Off Position Freeze=Off Altitude Freeze=Off Fuel Freeze=Off Position Set=Off Position Slew=Off Altitude Slew=Off Airspeed Slew=Off Heading Slew=Off Snap Shot Take=Off Snap Shot Recall=Off Speed Times Hi=Off Zero Fuel Weight Set=Off Fuel Weight Set=Off Temperature/Pressure Set=Off Aircraft Reposition=Off Wind Set=Off	

FIGURE 3. ARINC 429 Data Bus Analyzer

## ARINC 429 Data Bus Analyzer

### DESCRIPTION:

The ARINC 429 Data Bus Analyzer software provides the perfect analysis tool to test and maintain your avionics systems from a Windows 95/98/2000 or Windows NT based PC. When combined with one of DDC's hardware cards, the ARINC 429 Data Bus Analyzer provides flexibility for the capture, simulation, and display of ARINC 429 data on the bus.

This software application features real-time engineering unit conversion, data filtering, programmable triggering, discrete input and output triggering capabilities, and raw-data time stamping. This software enables engineers and maintenance personnel to easily test and maintain avionics systems.

Ideal for avionics development, production testing and flightline maintenance work, it allows the user to select and monitor up to 64 channels of ARINC 429 data. Unwanted information may be filtered out, and the raw ARINC binary data may be translated into a customizable, user-friendly display window. Each ARINC word is time-stamped as it is received, then archived to disk in ASCII or binary formatted files. The ARINC 429 Data Bus Analyzer can configure up to 32 separate transmit channels, each supporting dynamic data transmission using sine, triangle, square or sawtooth data formats. All transmit and receive channels can be run independently and simultaneously.

- Simple-to-Use Windows Interface
- Supports Windows 95/98/2000 and Windows NT
- Supports 32 Receive and 32 Transmit Channels
- User-Defined Data Filters and Triggers
- Provides Discrete Triggering Capabilities
- Supports FIFO and Scheduled Transmissions
- Saves Received ARINC 429 Data into ASCII or Binary Files
- Engineering Unit Database Includes Built-in Editing Tools
- Saves Analyzer Settings to Configuration Files
- Chronological and Monitor Data Display Formats

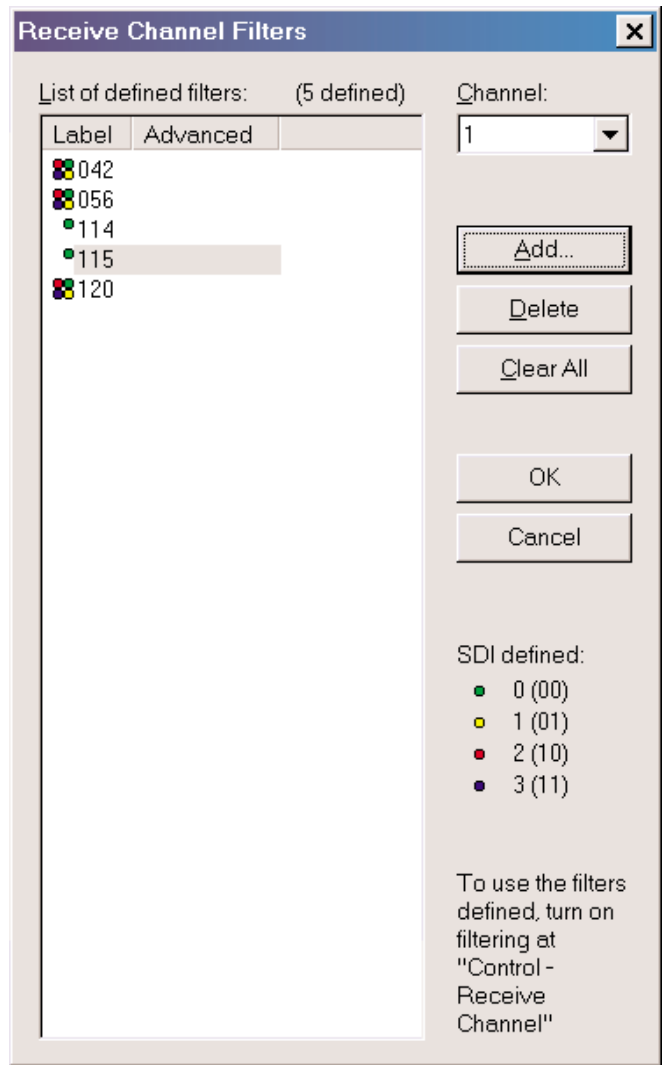
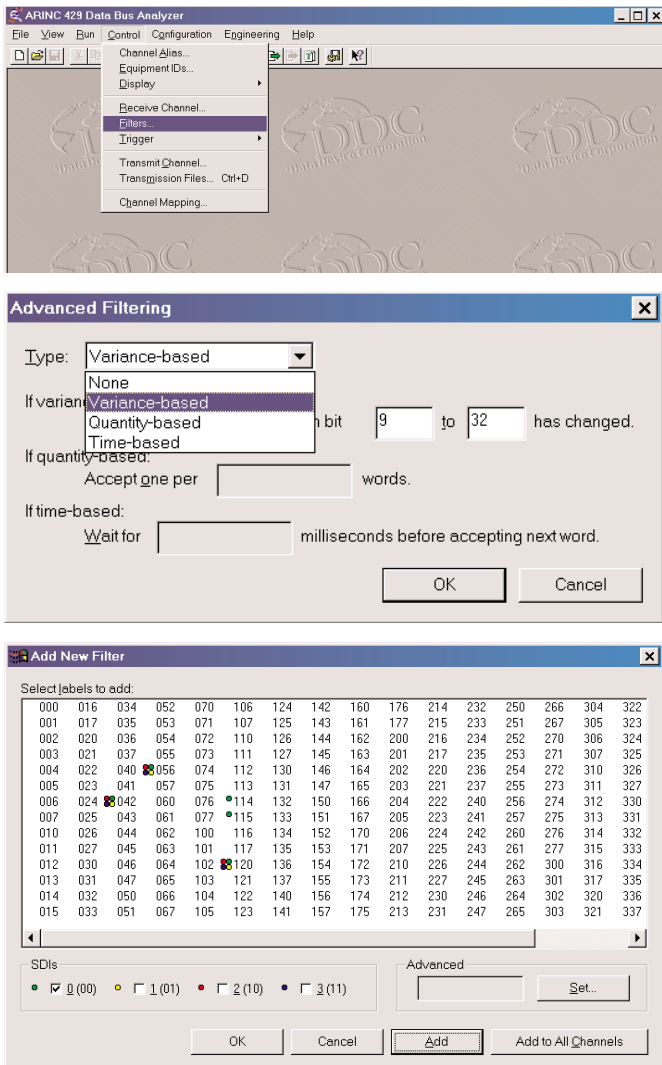


FIGURE 4. LABEL / SDI FILTERING

## USER-DEFINED DATA FILTERS

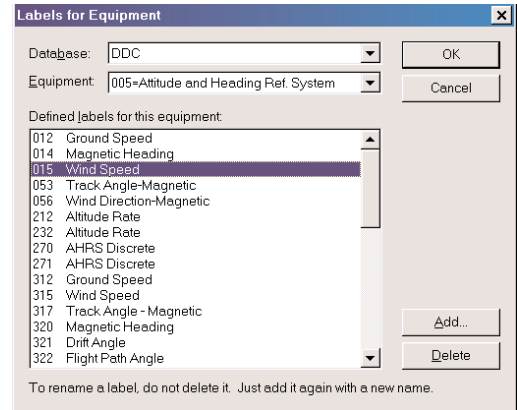
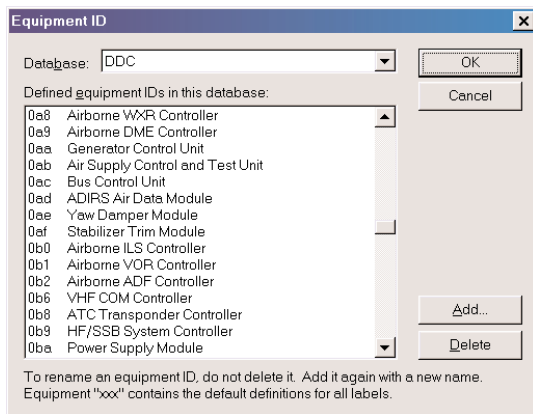
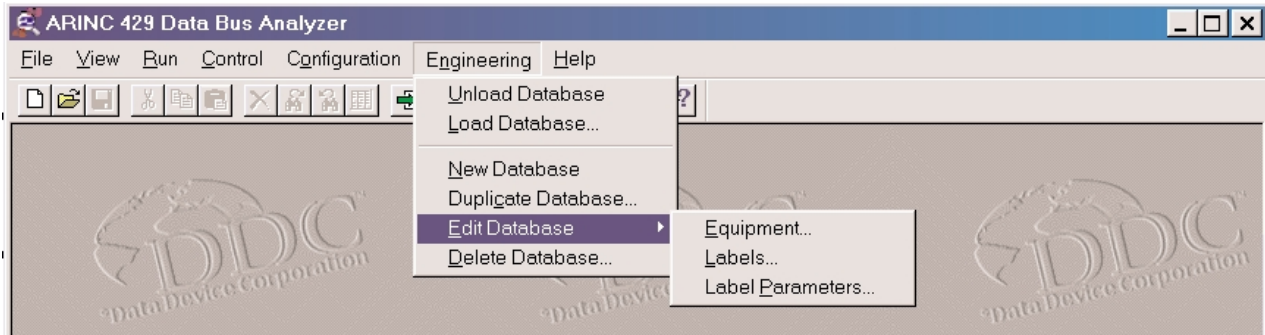
Data filtering for each channel is quickly defined from simple pull-down menus. When data filtering is enabled, only the ARINC word that matches the defined filter will be acknowledged and received. This minimizes the amount of data saved to disk and simplifies tasks by presenting only the data you need to see. Data filters are defined based on label/SDI combinations and are independent for each channel.

## ADVANCED FILTERING

Advanced filtering refers to the ability to filter data based on variance of a bit pattern. Filtering can also be based upon time period since the last filtered word was received and the number of words received since the last filter. All of these advanced filters are invoked by pressing the Set button in the Add New Filter window. Only one Advanced filtering option can be used per label/SDI combination.

## DATA LOGGED INTO ASCII OR BINARY FILES

All received ARINC 429 data is automatically logged to disk and can be saved in a standard ASCII format compatible with most text editors and spreadsheets, or in a binary format to minimize the space required to save the data. The size of the stored file is limited only by available free disk space and the maximum file size of the operating system in use. These saved files can be reloaded into the analyzer at a later time for post-processing, analysis, and editing. The ability to re-transmit (playback) a received file is also provided by the analyzer. And, since all incoming data can be time stamped, the data can be retransmitted in the same exact order and with the same exact data timing as the original received data. This allows the user to capture flight data to a file and play it back at a later time for simulation or testing purposes. Timer resolution for data reception is 1 millisecond for PCMCIA cards and 100 microseconds for all other ARINC-compatible cards.



**FIGURE 5. ENGINEERING UNIT DATABASE**

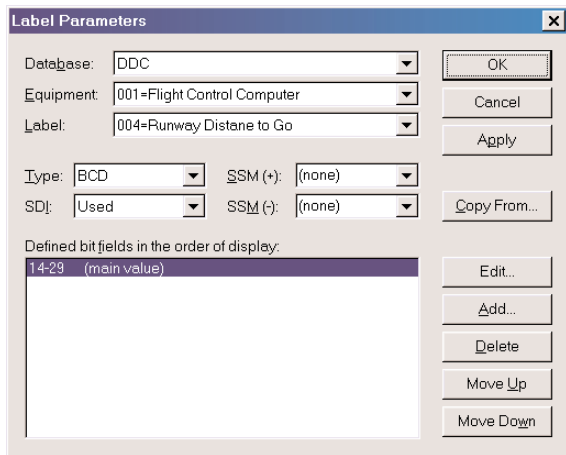
**ENGINEERING UNIT DATABASE**

Embedded in the analyzer software is an advanced Engineering Unit Conversion Database that contains all the words currently defined in the ARINC 429-15 specification. Once a channel's equipment ID is selected, this database automatically provides the required engineering unit conversions for the raw binary data received. It's then translated and presented to the user in easily recognizable terms, and displayed in individual columns (see FIGURE 3). Transmitted data can also be entered using engi-

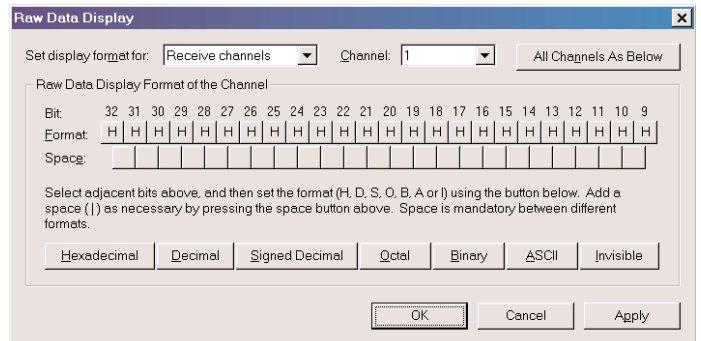
neering units. A built-in editor allows the customization of this database without the need to exit the analyzer (see FIGURES 5 & 6).

**RAW DATA DISPLAY FORMAT**

Data may be displayed in different formats. There are seven available data types that can be chosen for each bit deployed (see FIGURE 7).



**FIGURE 6. LABEL PARAMETERS WINDOW**



**FIGURE 7. RAW DATA DISPLAY OPTIONS**

## TRIGGERING

When triggering is enabled received data that meets only a certain set of user-defined criteria will be received and recorded to the computer's hard disk. Multiple channels can be used for triggering. Triggering can be the result of a specific binary bit pattern, engineering unit value, time tag of received words, or a discrete input value. Logical combinations of events can be created such that only the entire true, or not true combination of the entire event will trigger the condition. Logical statements such as "and" and "or" can be used to create the logical combinations of events. Pre-triggering can also be enabled such that data from an event can be recorded to disk.

## VIEWING DATA

Data files can be viewed in either chronological mode or monitor mode. Chronological mode displays all received data in sequential format from the first received word to the last received word. When in monitor mode only the latest received data word for a particular label is viewed.

Columns can be turned on or off and sorting of ARINC 429 data words can be achieved by pressing the column header button. All data in the file will then be sorted based on the data in that column.

## STATUS BAR

Analyzer status information appears in the Status Bar (if enabled). This information includes the monitor or chronological selection, the number of lines received, the total number of ARINC words received, the current configuration file, and the database that you have loaded. All of this information is displayed on the status bar in that order from left to right. The total word count is always equal to the total line count in chronological mode, but in monitor mode the number of lines is equal to the number of ARINC labels received at that point in time. The Status Bar appears on the bottom of the Data Bus Analyzer's display window and can be enabled/disabled by selecting Status Bar from the View menu.

## DISCRETES

A Discrettes window can be opened to monitor the status of input and output discrete values. This window has a high priority in the

Windows system and will always be visible over other windows even though the other windows are accessible. This means that reception and transmission of data can occur and the Discrettes window will stay on top of the main window for monitoring purposes. Discrettes can be used to trigger a collection of data, drive external events, indicate status and general purpose use.

## RECEIVING AND TRANSMITTING

Receive channels must be enabled to receive a transmission. Each receive channel's speed and filtering capability is individually selectable. Transmit channels must also be enabled to transmit data. Each transmit channel's speed is individually selectable.

Receive and/or transmit channels are selected by the user after DDC's ARINC 429 card has been installed. Any or all of the available channels can be mapped to a Logical Channel number of the ARINC 429 Data Bus Analyzer software. A flexible system such as this allows any combination of ARINC 429 cards to be mixed and matched to achieve the desired channel capacity for your application. Mapping of channels also alleviates the work associated with remembering which physical hardware channel is connected to the ARINC 429 data bus.

FIFO and Scheduled transmissions can occur simultaneously. A Scheduled transmission involves placing a time constraint on the word to be transmitted. This means that a transmission rate, start time, stop time, and offset time can be specified by the user for each 32-bit ARINC word. Scheduled transmissions have priority over FIFO transmissions. A FIFO transmission will be transmitted in the gap between scheduled transmissions without altering the time of the scheduled data. FIFO files can be continuously looped. An Inter-file delay parameter is available for files being transmitted in FIFO mode.

## SETTINGS SAVED IN CONFIGURATION FILES

Settings that define the bus analyzer's operational parameters (channel speed, trigger condition, transmission data, display format, etc.) are user-definable. Once a configuration is determined, its settings can be saved into individual files. This allows the creation of any number of special configuration files that can be saved and reloaded as needed.

# DD-42999S0

## ARINC 615 DATA LOADER

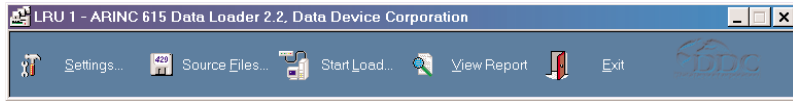


FIGURE 8. MAIN MENU BAR

### ARINC 615 Data Loader

#### DESCRIPTION

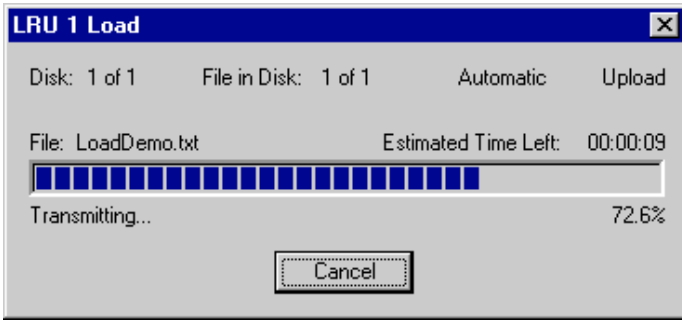
The ARINC 615 Data Loader for Windows 95/98/2000 and Windows NT, when used in conjunction with a DDC ARINC 429 card, provides the full functionality of a portable or airborne Data Loader. It can be used as a development tool during line-replaceable unit (LRU) design, a tool for maintenance data retrieval, or as a general purpose 615 Data Loader for uploading and downloading operational and database software. The ARINC 615 Data Loader was designed to the ARINC 615-3 specification, and supports ARINC 603 loading as well.

This software, when combined with a desktop PC-compatible computer and a DDC ARINC 429 interface card, provides a cost-effective solution to manufacturing, depot repair and shop data loading. When combined with a portable notebook computer and a DDC PCMCIA ARINC 429 card, it creates a cost-effective and portable solution, which is ideal for flightline use or as a field engineering tool.

This software application features discrete output triggering capabilities, simultaneous loading of multiple units, multiple user modes, raw-data time stamping capabilities, and advanced history logging which logs all of the received and transmitted signals as seen by the ARINC 615 Data Loader to a file.

#### FEATURES

- Simple-to-Use Windows Interface
- Supports Windows 95/98/2000 and Windows NT
- Supports Loading Multiple Units Simultaneously
- Can Operate as Sub-Function to Other Programs
- Single-User or Administrated Multi-User Modes
- Performs in Both Automatic and Control Mode
- Supports Multiple Disk Loading
- Provides Discrete Triggering Capabilities
- Uploads Faster Than Typical Airborne Data Loaders
- 615 Protocol Analysis With Debugging Diagnostic Output

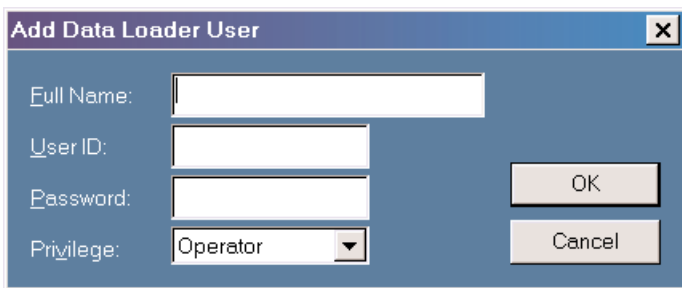


**FIGURE 9. PROGRESS INDICATOR**

## INTRODUCTION

The ARINC 615 Data Loader is capable of uploading data and operational programs to airborne computers as well as downloading operational data. Communications with the airborne computer can take place at either high speed (100kbps) or low speed (12.5kbps) via the ARINC 429 data bus. Transfers can occur in either automatic or control mode.

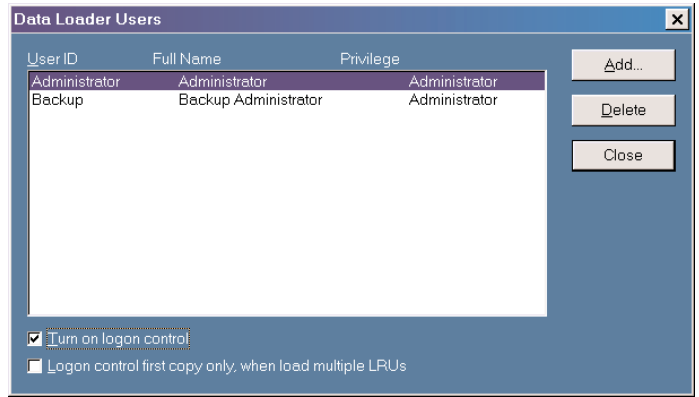
During the data load process, a progress indicator is displayed that indicates the status of the data load (see FIGURE 9). As with the DOS predecessor to this product, the software supports single- or multiple-disk loading from fixed hard or floppy disks. In addition, any other valid device in the system may be used as a source of data, including a CD-ROM, Mag-Optical Disk or network connection.



**FIGURE 10. LOGON CONTROL**

## SIMULTANEOUS LOADING OF MULTIPLE LRUs

Multiple LRUs can be simultaneously and asynchronously loaded by simply invoking multiple instances of the ARINC 615 Data Loader, and specifying the appropriate ARINC 429 channels to be used for each instance. A maximum of 32 devices can be loaded simultaneously.



**FIGURE 11. USER ACCOUNT ADMINISTRATION**

## SUB-FUNCTION OPERATION

To facilitate the varying needs of a wide user base, this software has been designed to operate either as a stand-alone user-interactive package, or as a subsystem to an automated test system or custom application.

In the stand-alone mode, the user is provided with a graphical interface panel, and all user interaction is performed via pull-down menus and pop-up windows (see FIGURE 8 for main menu bar).

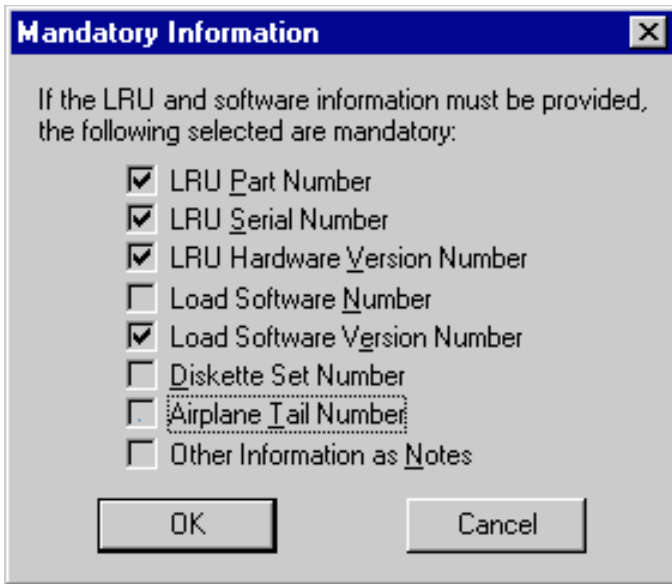
When used as a subsystem, the ARINC 615 Data Loader can be called via a system executive call from any other windows program (e.g., Visual Basic, Visual C++ or LabVIEW®). All parameters to the load can be passed on the command line and the pass/fail results can be tested once the load is complete.

## SINGLE-USER OR ADMINISTRATED MULTI-USER

The ARINC 615 Data Loader Software can be installed as a simple single-user application, or as a multi-user, logon-controlled system under the control of a system administrator (see FIGURES 10 & 11).

In the simple single-user mode, no restrictions are placed on the user. The user may change any settings, and create or delete any files or directories. This mode may be most appropriate for engineering development work.

In the administrated mode, logon control is protected by passwords assigned by the system administrator. System operators may run the software and generate loading reports. System administrators may also add new users, install new loadable software to the hard disk, and reconfigure the ARINC 615 Data Loader software settings.



**FIGURE 12. LOAD REPORT HEADER CONTENTS**

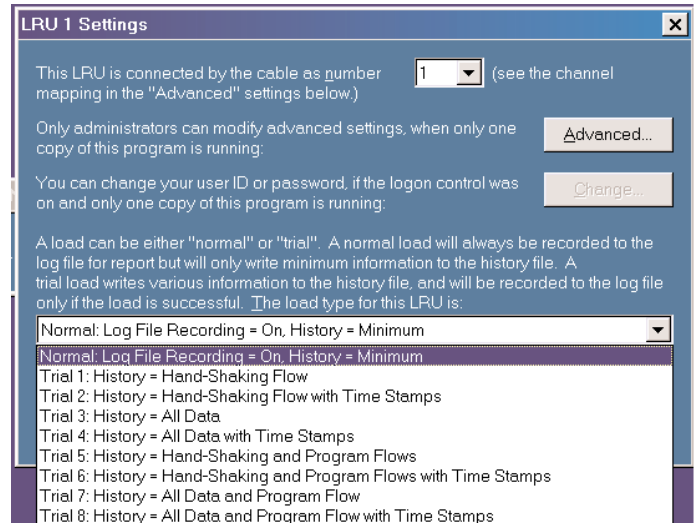
## REPORT GENERATION

A robust logging and report generation feature creates production reports, or load verification reports for QC. The software can be set to require the user to enter certain fields during the data load process (see FIGURE 12). This data is then added to the data load report.

The user may also request protocol diagnostic reports useful in debugging LRU design problems. These reports contain a history of all communication between the LRU and the Data Loader.

A data load can be classified as either “normal” or “trial”. A normal load will always be recorded to the log file for reports but will only write minimum information to the history file. A trial load writes communication information to the history file and will be recorded to the log file only upon a successful load.

There are nine options available to the user for logging data to a history file. Each option provides a different level of detail of the communication signals transmitted and received by the ARINC 615 Data Loader. FIGURE 13 shows all of the options available for logging data to the history file.



**FIGURE 13. LOG FILE RECORDING SETTINGS**

## ADJUSTABLE TIMING CONTROL

The ARINC 615 Data Loader allows for flexible control of all timing parameters of the data loading process. This allows for users to change up to 14 timing parameters if they are loading a unit that does not follow the exact timing of the specification. This way the user can adjust the timing parameters to allow for a successful load.

## DISCRETES

The ARINC 615 Data Loader provides discrete triggering capability to the user. The user can select the outputs to trigger upon the start of data loading. Once a data load has begun the defined discrete outputs will be driven to a closed circuit ground state as per the ARINC 615-3 specification. The discrete outputs will be set to an open circuit state upon termination of the data load as per the ARINC 615-3 specification.

## CONFIGURATION FILE

The ARINC 615 Data Loader is configured through the on-screen menus. The configuration file is a file that can be stored on a data loader disk. This file contains configuration information for the loader. The presence of this file is optional. The configuration file is identified by the MS-DOS file name "config.ldr". This file can be used in conjunction with the ARINC 615 Data Loader to specify configuration information.

This file contains parameter identifiers each having an associated parameter value. Each parameter is identified by a three-character abbreviation. This configuration file may not exceed 1024 bytes in length as per the ARINC 615 specification. More details about this file can be found in the ARINC 615 specification.

## UPLOADING / DOWNLOADING FILE(S)

The ARINC 615 Data Loader is fully compliant with the ARINC 615 specification to successfully upload and download files to and from an airborne computer.

Files can be uploaded or downloaded to and from the airborne computer in the Automatic Mode or in the Control Mode.

Automatic Mode is applied to an upload or download operation in which data blocks are continuously transmitted without requiring commands to start each block operation.

Control Mode is applied to an upload or download operation in which the host computer must initialize the transfer of each block of a file with a command.

The software follows the ARINC 615 specification for performing all downloading and uploading.

## APPLICATION SOFTWARE

DD-42999S0 COMMERCIAL AVIONICS UTILITIES SOFTWARE SUITE:

- Includes:            ARINC 429 Data Bus Analyzer  
                          ARINC 615 Data Loader

## DOCUMENTATION

The DD-42999S0 Commercial Avionics Utilities Software Suite includes detailed installation instructions and user documentation.

## CUSTOMER SUPPORT

Data Device Corporation is committed to providing unsurpassed customer support. All hardware has a two-year limited warranty. All library and driver updates are available free of charge for the life of the product. This does not include this application utilities software package.

### Ordering Information:

DD-42999S0  
     └── Commercial Avionics Utilities Software Suite  
           (includes ARINC 429 Data Bus Analyzer and  
           ARINC 615 Data Loader)

TABLE 1. SYSTEM REQUIREMENTS	
<b>ARINC Cards:</b>	
PC Compatible ISA Cards:	DD-42988P1-300 DD-429XRP5-300
PCMCIA Cards:	DD-429RXM2-300    X = Transmit DD-429XRM3-300    R = Receive
PCI Cards:	DD-42916i3-300 DD-42924i5-300
VME Cards:	DD-42916V3-300 DD-42932V3-300
PMC Cards:	DD-42916C1-300
cPCI Cards:	DD-42916T3-300 DD-42932T6-300
<b>Hardware:</b>	Pentium 200 MHz CPU or faster Color Monitor (VGA Recommended)
<b>Operating Systems:</b>	Windows 95/98/2000 or Windows NT

The information in this data sheet is believed to be accurate; however, no responsibility is assumed by Data Device Corporation for its use, and no license or rights are granted by implication or otherwise in connection therewith.  
Specifications are subject to change without notice.



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**Southeast** - Tel: (703) 450-7900, Fax: (703) 450-6610  
**West Coast** - Tel: (714) 895-9777, Fax: (714) 895-4988  
**United Kingdom** - Tel: +44-(0)1635-811140, Fax: +44-(0)1635-32264  
**Ireland** - Tel: +353-21-341065, Fax: +353-21-341568  
**France** - Tel: +33-(0)1-41-16-3424, Fax: +33-(0)1-41-16-3425  
**Germany** - Tel: +49-(0)8141-349-087, Fax: +49-(0)8141-349-089  
**Japan** - Tel: +81-(0)3-3814-7688, Fax: +81-(0)3-3814-7689  
**World Wide Web** - <http://www.ddc-web.com>

