ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Teledyne Controls / Pacific Avionics PAC-429C-2x4/H-1* at our website: *Click HERE*

Wayback Machine </web/>

Oct NOV *FEB*
</web/19970206170537/http://www.pacav.com/products/429CCRD.html>
Previous capture 13 Next capture
</web/19970206170537/http://www.pacav.com/products/429CCRD.html>
1995 1996 1997

*2 captures*
</web/19961113090710*/http://www.pacav.com/products/429CCRD.html>
13 Nov 96 - 6 Feb 97

sparklines

Close <javascript:;> Help <http://faq.web.archive.org/>

# ARINC 429 PC Interface Cards

## Full Size Cards

"The industry standard ARINC 429 test tool..."

* 1, 2, 4 or 8 transmit channels
* 2 or 4 receive channels
* High or Low speed
* On-board Intel 80C186 microprocessor (12.5 MHz)
* 16 KBytes Dual-Port RAM
* 5 In / 5 Out TTL discretes
* Configurable PC Memory and I/O addresses
* Programmable Interrupts to the PC
* Up to four cards per PC

### Description

The PAC-429 Card is a full size (IBM/AT Type, ISA/EISA compatible) PC Interface card which provides an intelligent communications link between a host personal computer and an ARINC 429 Data Bus. The card adheres strictly to the ARINC 429 specification by using the Harris Chip Set.

The PAC-429 Card also conforms to the Mark 33 Digital Information Transfer System 429-14 specifications and will communicate with the following ARINC specifications: 419, 429, 568, 575, 582, 717, 724.

LRU developers find that PAC-429 Cards provide easy access to simulating and testing new systems prior to use with actual flight systems.

Avionics maintenance and validation teams can perform end item testing in the laboratory and, by using portable or rack-mount PCs, they can continue testing in an actual aircraft environment.

The PAC-429 Card has an on-board Intel 80C186 processor, which off-loads much of the low-level data processing from the host PC. The host PC easily transfers ARINC 429 receive and transmit data to and from the card through the 16 KBytes of on-board dual-port RAM.

Cards are available with 1, 2,4 or 8 transmitters and 2 or 4 receivers, all of which can be operated at either high or low speed.

## Card Models

### PAC-429C-1x2

The 1x2 card supports one transmitter and two receiver channels. This card is designed to support users looking for a low-cost solution for test environments where few channels are needed. The PAC-429 1x2 card can be upgraded to a 2x4, 4x4, or 8x4.

### PAC-429C-2x4

The 2x4 card supports two transmitter and four receiver channels. This is PAC's most popular model which has the best price/performance ratio. The PAC-429 2x4 card can be upgraded to a 4x4, or  8x4 card with the addition of a multiplexer "daughter card".

### PAC-429C-4x4

The 4x4 card supports four transmitter and four receiver channels. These additional transmit channels are gained through use of a multiplexer Òdaughter cardÓ, requiring a second PC slot. The multiplexer card takes the output from the two transmitters on the 2x4 base card and multiplexes each of them to two transmit channels. Only one transmitter from each multiplexed pair can be transmitting at a time.

### PAC-429C-8x4

The 8x4 card supports eight transmitter and four receiver channels using the multiplexing process described above for the 4x4 card.

## Card Features

### I/O Addressing

The PAC-429 Card has two jumpers that configure the I/O address at which the PC accesses the card. There are four possible address ranges: 300-306 Hex, 310-316 Hex, 340-346 Hex, and 350-356 Hex. Each card placed in a PC must be configured to use a separate address, allowing up to four cards to be placed in a single PC.

### Dual-Port Memory Addressing

The card has two rotary switches that configure the starting address at which the PC accesses the 16 KByte dual-port memory window. Valid

settings are from A000:0000 to FC00:0000.

## Program Memory Addressing

The PC accesses the program memory through a single 64 KByte window that can be switched between the first and second "halves" of the total 128 KByte program memory. The card has one rotary switch that configures the starting address at which the PC accesses the 64 KByte program memory window. Valid settings are from A000:0000 to F000:0000. The program memory window can "overlap" the dual-port memory window, and memory windows of other PAC-429 Cards in the PC.

## Interrupts

There are six jumpers on the card that selects which IRQ line the card uses to send interrupts to the PC. The valid settings are IRQ 2, IRQ 3, ... , IRQ 7, or none.

In addition, there are four jumpers on the card which connect the Harris receiver channels to interrupt lines on the 80C186 processor. This allows users who are writing their own software for the 80C186 to enable or disable these receive interrupt lines.

## Discretes

Each PAC-429 Card provides 5 TTL compatible discrete inputs and 5 TTL compatible discrete outputs. Each output can provide up to 35 mA of source current at +5 volts.

## ROM Features

The software in ROM, which starts executing when the PC is first powered up, responds to a number of commands that are placed in the FROM-PC FIFO.

The ROM commands include the following built-in-test functions: generate a PC interrupt, fill dual-port with decrementing values, fill the first page of program RAM with NOPs, turn on all the discrete outputs, and loop FROM-PC FIFO to TO-PC FIFO.

In addition, there are commands that cause the card to jump to a certain address and begin executing, which are used by software developers to run newly loaded programs.

## ARINC 429 Interface

Each receiver channel will buffer two words which can be read by the 80C186 processor. Each transmitter channel will buffer eight words which will be transmitted with the minimum 4 bit gap when the transmitter is enabled. Status bits which can be read by the 80C186 processor indicate the current status of the receive and transmit buffers.

Received words are automatically checked for expected  parity, which

can be set to even or odd. Proper parity (even or odd as specified by the application) is automatically generated for all transmitted words.

Any receiver or transmitter can be either high or low speed. On the receive channels, data can be filtered by the hardware based on the SDI (bits 9 and 10).

## Included Software

### Programmer's Toolbox

The Programmer's Toolbox is a library of driver functions included with all PAC-429 PC Cards that allows a user to develop PC software without knowledge of the card's architecture, and will support up to 4 cards simultaneously. The Toolbox is made up of three parts: (1) the "HEX" file that contains the toolbox executable code that runs on the card and is automatically loaded when the user software is initialized, (2) the header files used to develop software for the toolbox which contain function prototypes and structure definitions, and (3) the library itself which can be supplied in a Microsoft "C", a Borland "C", or as a Windows DLL. The "C" Libraries have been developed for use with any memory model.

The Toolbox supports two modes of transmission: Scheduled, and FIFO (First-In-First-Out queue). The Scheduled transmission allows the user to configure the card to automatically transmit labels on a particular channel at regular intervals. The FIFO transmission allows the user to transmit a series of words in sequence. FIFO and Scheduled transmissions can be intermixed on a single channel.

The Toolbox supports two modes of reception: Mailbox and FIFO. The Mailbox reception allows the user to retrieve the "latest" copy of data received on a particular label. This mode would be used when the user is only interested in the most recently received data. The FIFO reception allows the user to dequeue words in the same sequence as they were received on the channel. The words placed in the receive FIFO can be filtered by their label and time stamped.

The Toolbox also supports the input and output discretes on the card by allowing the user's software to request the current state of the input discretes, and change the state of the output discretes.

### Diagnostic Software

The diagnostic software provided with each PAC-429 Card verifies that the card is installed and operating properly. This is useful when a card is first installed in a PC, in order to verify that the card and PC are communicating, i.e., that the card has been configured correctly for a particular PC.

The diagnostic software verifies the operation of the command/response FIFOs, the dual-port and program RAM, the input and output discretes, the PC interrupts, the ARINC receive/transmit hardware, as well as the ARINC transmit drivers.

## Examples of Standard Toolbox Functions:

*Configuration Initialize*
OpenChannel, SetChannelSpeed, Shutdown

*Multiple Card Support Functions*
SetCurrentCard, GetCurrentCard

*Transmitting*
Transmit_FIFO, Transmit_FIFO_Block, Kill_Scheduled,
Transmit_Scheduled, EnableParityAsData

*Receiving*
AddLabel, Receive_Mailbox, Receive_FIFO, Receive_FIFO_Block,
Clear_FIFO

*Status Inquiry*
GetChannelStatus, GetChannelSpeed, GetPendingArincWords,
GetScheduledLabelValue, GetTimerResolution

*Time Calculation*
Get429AbsoluteTime, SetInitialAbsoluteTime, Get429TimeDifference,
ZeroCardClock

*Interrupts*
EnableGlobalCardToPcInt, ClearPCInterrupt

*Also Reading/Writing Discretes, Diagnostics,
Message Display, Error Handling & Utility Functions*

## Optional ARINC 429 Software

*Data Bus Analyzer* (PAC-429S-DBA)
- menu driven, easy access to data analysis of ARINC 429 bus traffic. Features include filtering, and triggering with real-time raw data conversion in user definable engineering units.

*Protocol Interface Tester* (PAC-429S-PIT)
- allows development of high level scripts to transmit ARINC 429 data on multiple High or Low speed transmit channels simultaneously. This software can transmit data based on the contents of received data, therefore simulating complex ARINC 429 protocol scenarios.

*ARINC 615 Data Loader Simulator* (PAC-429S-DLS)
- performs all functional requirements of a portable or airborne ARINC 615 (603) data loader.

*Williamsburg Protocol* (PAC-429S-WPS)
- monitors and simulates the protocol used for file transfer of binary or character oriented file data between airborne systems such as ACARS.

Other LRU simulation software is also available such as: 739 MCDU Simulator or MCDU/IDU Monitor, Boeing 747-400 CMC, Flight Simulator, & 740 Printer Simulator.

## Technical Overview

The card is user programmable with an Intel 80C186 processor and 128 KBytes of program memory (which can be written by the host PC when the 80C186 processor is stopped). There are 4 KBytes of ROM that contain software that "boots" the card so programs can be downloaded. The ROM code also aids in diagnostic testing.

There are 16 KBytes of dual-port RAM that can be accessed by both the PC and the cardÕs 80C186 processor. This dual-port RAM is used to transfer ARINC 429 receive and transmit data to and from the card. Two on-board 512 Byte FIFOs communicate commands and responses to and from the card.

The PAC-429 Card is configurable from 1TX / 2RX to 8TX / 4RX and all transmitters and receivers can be operated at either high or low speed. In addition to the ARINC 429 transmitters and receivers, the card has 5 input and 5 output TTL discretes which provide the capability to control external devices or indicate external events.

## Specifications

### Physical Characteristics:

Standard Card Size: 3.9" x 13.3" (XT Size) I/O Connector: DB-37
Daughter Card Size: 6.9" x 3.05" I/O Connector: DB-25

### Environment:

Operating Temperature: 0-50 ° C at no more than 90% relative humidity.

### Electrical:

+5 VDC @ 400 mA maximum, ± 12 VDC @ 20 mA maximum

### Selectable Options:

Card jumpers control PC interrupts. Card switches and jumpers control PC memory address and card I/O addresses.

### Documentation:

Detailed installation instructions and user documentation are provided with all products.

### Support:

PAC is committed to providing unsurpassed customer support. All hardware has a one year limited warranty and software has a 90 day

limited warranty. For this warranty period, all software updates are free. Extended warranties are available for all products. Should the need arise for product repair, our goal is to have you back on-line within 48 hours for domestic companies, and 96 hours for international firms.

Pacific Avionics is continually updating and developing new hardware and software products. Please call for the latest product information.

## Ordering Guide

| *Model Number | Description* |
|---|---|
| PAC-429C-1x2 | 429 PC Interface Card with 1 TX and 2 RX |
| PAC-429C-2x4 | 429 PC Interface Card with 2 TX and 4 RX |
| PAC-429C-4x4 | 429 PC Interface Card with 4 TX (multiplexed) and 4 RX |
| PAC-429C-8x4 | 429 PC Interface Card with 8 TX (multiplexed) and 4 RX |

All trademarks or registered trademarks mentioned herein are the property of their respective owners.  May 1994

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP