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ARINC 629 PC Interface Cards

PAC-629C-P30 Series Cards

"The most valuable 629 test and development PC tool available..."

- On-board Hardware Time Stamp and High Speed Data Logging
- SIM and Pseudo Bus Interfaces
- DATAC and SIM Chip Sets
- Multiple cards in a PC
- Selectable Bus Error Injection
- Multiple Terminal Simulation
- Discrete Input/Output
- 128 KBytes Programmable Personality PROM RAM
- 256 KBytes Receive/Transmit Shared Data Memory
- Receives its own Transmitted Data

Description

The PAC-629C-P30 series cards are full size (IBM/AT Type, ISA/EISA compatible) PC Interface Cards which provide an intelligent communications link between a host Personal Computer and an ARINC 629 Digital Autonomous Terminal Access Communications (DATAC) Data Bus. The cards employ the DATAC and Serial Interface Module (SIM) chip set.

The PAC-629 Card allows the user to communicate with any system on an ARINC 629 Bus and simulate airplane data. The card can be used to test and debug LRUs in development or test existing LRUs which are returned for maintenance.

The Transmit Personality PROM (XPP), Receive Personality PROM (RPP), and Multiple Personality PROM (MPP) simulations are performed using 128 KBytes of static RAM that may be written or read by the PC. Receive and transmit data is read from and written to 256 KBytes of dual-ported memory. The card's memory access arbitration gives priority to the DATAC chip for data access-collisions. All DATAC functions are accessible from the PC, including control of the SIM Built-In-Test (BIT) functions.

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Card Models

PAC-629C-P30
The P30 cards include an ARINC 629 DATAC and SIM chip set, Dual-ported SRAM for Personality PROMs (XPP, RPP, MPP) and DATAC Data Memory, one discrete input and output, and both Pseudo-Bus and SIM-Bus interfaces.

PAC-629C-P31
The P31 cards have all the features of the P30 cards, and in addition, they have a one microsecond resolution hardware time stamp, time synchronization (between cards or other equipment), and FIFO logging of all wordstrings (or filtered wordstrings) on the ARINC 629 bus.

PAC-629C-P32
The P32 cards contains all of the features of the P31 cards, and also support error injection and DMA data transfer.

Card Features

Complete Error Injection

The PAC-629 P32 Card is capable of injecting errors onto the ARINC 629 bus. This feature can be used for checking the reaction by another LRU on the bus to communication errors. The bus errors which can be injected includes:

- Parity errors
- Manchester bit clock errors
- Sync errors
- Short word errors
- BUSQ (Bus Quiet) errors
- Babbling errors
- Short string errors
- EOS (End of String) errors
- Impersonation Errors
- EOM (End of Message) errors
- Illegal transmission (NXOK) errors
- PAM (Protocol Access Module) errors
- No Bus Acknowledge (NRBA) errors
- Deaf Monitor errors

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Multiple Terminal Simulation

P30 series cards can simulate transmission of wordstrings from Multiple Personalities, or multiple systems with unique CIDs, using either of the two following methods:

The first method is to use the AXT field of the XPT. This field can be used to define a wordstring with a Channel ID that is different from the strapped CID. Using this feature, the CID for every wordstring in the entire XPT transmit schedule can be independently defined.

The second method is to use the strapped CID value as the cardÕs CID. This field can be changed as the card is running. In addition, the card can swap between 12 XPTs.

Double Buffered Receive/Transmit RAM

The PAC-629 Card provides 128 KWords (256 KBytes) of static RAM which can be used for transmitting and receiving data to and from the ARINC 629 bus. This dual-port RAM can be accessed by the DATAC chip and the host PC under a fixed-priority arbitration system.

The card's Data RAM memory can be set up for double buffering to ensure wordstring or message integrity. The buffering of the transmit and receive data RAM is independently controlled. Selection of single or double buffering is software controllable. The buffer swapping is performed by the hardware at a "safe" time, but cannot occur unless the swapping has been "armed" by the software.

High Speed Data Logging

The Time Stamp and Data Logging FIFO and the Time Stamp Flag RAM give the PAC-629 Card the ability to time stamp each received wordstring event and log the received data words. This feature also provides the capability to log the cardÕs own transmitted data. Through software controllable registers, the user can set the card to time stamp received wordstrings, log the data from the received wordstrings, or log both the time stamp and data from the received wordstrings. This data can be stored at high speeds to PC memory or to disk by utilizing the DMA (Direct Memory Access) feature built into the cards.

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Programmer's Toolbox

The Programmer's Toolbox is a "C" language library of over 70 functions that is included with each PAC-629 Card. These functions provide a high level programming interface to the registers on the card, thus eliminating the need for the user to have in-depth knowledge of the card architecture or to write their own low level interface software.

Software applications can be easily developed to transmit and receive data on the 629 bus. The user has flexibility in programming the card, which allows simulation of any airplane LRU or system communicating on the 629 bus.

The Programmer's Toolbox is available for the PC as a library format compatible with both Microsoft C/C++ and Borland C/C++ compilers. It is also available as a DOS Device Driver, Windows 3.1 Dynamic Link Library (DLL), and as a LynxOS Device Driver. The toolbox can be run with any of the P30 series cards.

Command Line Controller

The PAC Command Line Controller software provides low level access to most features of the PAC-629 Cards. This includes programming the Personality PROMS, reading and writing to card memory and registers, and monitoring the contents of the FIFO. The CLC also allows the user to ramp transmit data and monitor received data in real time, for up to 16 cards.

The CLC centers around the command line interface, which uses short commands to read and write memory and registers. Script files containing the commands may be created and executed, and log files detailing the entire session can be saved. The script file is an ASCII file that can be generated or edited by any text editing software, allowing easy creation and modification of test scenarios.

The CLC allows the user to immediately access data on the ARINC 629 bus without having to write an application program. It allows control of the terminal parameters and provides a status of the DATAC and card state.

Automated repeatable tests can be written through the CLC script language to allow testing of another LRU communicating on the bus.

Diagnostic Software

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simultaneously, limited only by the available PC slots.
Examples of standard Toolbox functions:

Configuration
SetIOAdr, InitDATAC, SIMBus, LoadConfig,

Module and DATAC Control
RunDATAC, SetAXT, SetDscrtCtrl

DATAC Setup
BlockMode, EnableAltSched, SetCID, SetTG

DATAC Pulse Signal Control
SetCMDP, SetMAFS, SetMIFS

SIM Control
SetSIMBITC, SetSIMCTH

Personality PROM (PPROM) Memory Access
FillPP, ReadPP, SetPP, LoadPP, StorePP, WritePPByte

Dual Port Data RAM Access and Status
EnableDataMem, WriteRAMWords, ReadRAMWords

Status
DATACStatus, ErrorReg, LastWord, XmitIntVec

Data Double Buffer Control
ArmRecvBufSwap, ArmXmitBufSwap, GetAuxStatus

Timer/FIFO Control
GetTimerStatus, ReadFIFO, SetFlagRAM, LoadFlagRAM

Error Injection
SetErrDelay, SetErrRepeat, SetErrTrig, GetErrStatus

Discrete I/O
SetDscrtCtrl, GetDscrtStatus

DMA Data Transfers
GetDMAStatus, SetTimerCmd, SetTimerMask

Utilities
WriteStatus, P629T_version

Optional ARINC 629 Software

Personality PROM Designer and Terminal Controller (PAC-629S-PDC/P) - Windows 3.1 interface provides ease in constructing Personality PROM tables, downloading to and initializing PAC Cards, & performing basic bus analyzer functions.

Data Bus Analyzer (PAC-629S-ANZ/P) - 629 bus analysis

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Discrete Parameters Monitor (PAC-629S-DPM/P)
- Provides monitoring, displaying, and recording of up to 1000 discrete data parameters, each with a unique status.

Technical Overview

The PAC-629 P32 card utilizes the ARINC 629 DATAC and SIM chip set. This card makes it possible to communicate with other 629 systems through the SIM bus or the Pseudo-Bus from a PC. The SIM can be powered from supplies on the card or from an external source.

Most features on the card are controlled through PC accessible registers which provide a high level of card flexibility and programmability. Access of the DATAC data memory is performed as direct PC reads and writes to the card memory at full bus speeds. Performance can be optimized by setting up the card to generate an interrupt to one of the PC IRQ lines.

The on-board clock, which is used to time stamp wordstrings, can be generated using either the on-board oscillator or from an external time reference source. The cards contain a clock clear input, which allows synchronization of all cards and equipment in a test system. The card also has a discrete input, a discrete output, and an accessory interface to connect to external test systems.

Specifications

Physical Characteristics:

P30 Series Card Size: 4.4" x 13.3" (AT Size)

Connectors: one male DB-9 (SIM-Bus), and one female DB-9 (Pseudo-Bus)

One DIN-9P (Ext Power & Discretes)

Environment:

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

Storage Temperature: -20 Ð 70 ° C, non-condensing

Electrical:

+5 VDC @ 200 mA maximum (without SIM)
+5 VDC @ 2.4 A maximum peak (with SIM & Coupler)

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PC memory 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-629C-P30	Advanced 629 PC I/O Card
PAC-629C-P31	Advanced 629 PC I/O Card w/tms
PAC-629C-P32	Bus Analysis 629 PC I/O Card

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