

# ARINC 429 to Discrete Signal Converter (SR429/1)

Converting an ARINC 429 signal to discrete outputs is simple with the software-free, firmware-free SR429/1 signal converter from NEXSYS. The SR429/1 can be pre-configured to any specific ARINC label, or can be ordered as a universal converter that the integrator may set to any desired label prior to installation. In either case, the SR429/1 delivers each of the 23 data bits on its own dedicated output pin, providing the utmost in design and specification flexibility.



## Key Features & Physical Characteristics

**Simple Integration:** The SR429/1 contains no software, firmware, or programmable logic. System design and implementation time is shortened by not requiring DO-178 and DO-254 qualification.

**Performance:** The SR429/1 meets or exceeds DO-160 and equivalent MIL-STD test levels. See *Table 7 Qualification Level Summary* for a full description of test parameters, including EMC.

**Label:** The SR429/1 accommodates a single valid ARINC label (000 – 377). The specified label can be factory preset, or set by the user when ordering a Universal unit – See *Table 1*.

**Input Speed:** The SR429/1 is a compliant ARINC 429 receiver that may be ordered as a high speed (100 kbps) or low speed (12.5 kbps) unit. Universal units can be set to either speed – See *Table 3*. Pins 1 - 4 incorporate ARINC input and shielded grounds – See *Table 4*.

**Discrete Outputs:** ARINC 429 bits 9 through 31 are latched as unique outputs on dedicated connector pins 9 - 31 – See *Table 4*. Each output contains the most recent data received for the selected label. Data is held until a new word containing the selected label is received.

**Output Signal:** Unit must be specified as “Active Low” or “Active Open” (See *Table 6*). For Active Low, unit powers up with all bits as 0 and each output as open (high impedance). When the associated data bit is high (1), output pins 9-31 are active low (ground). For Active Open, unit powers up with all bits as 0 and

each output as low (ground). When the associated data bit is high (1), output pins 9-31 are active open (high impedance). The maximum current is 1 A per pin, all output pins combined cannot exceed 12 amps.

**Master Reset:** The SR429/1 includes a Master Reset (/MR) input (Pin 36) that resets back to its power up state and holds the unit in reset as long as the master reset line is held low. Upon release, the unit remains in the power up state and is ready to receive the specified data label.

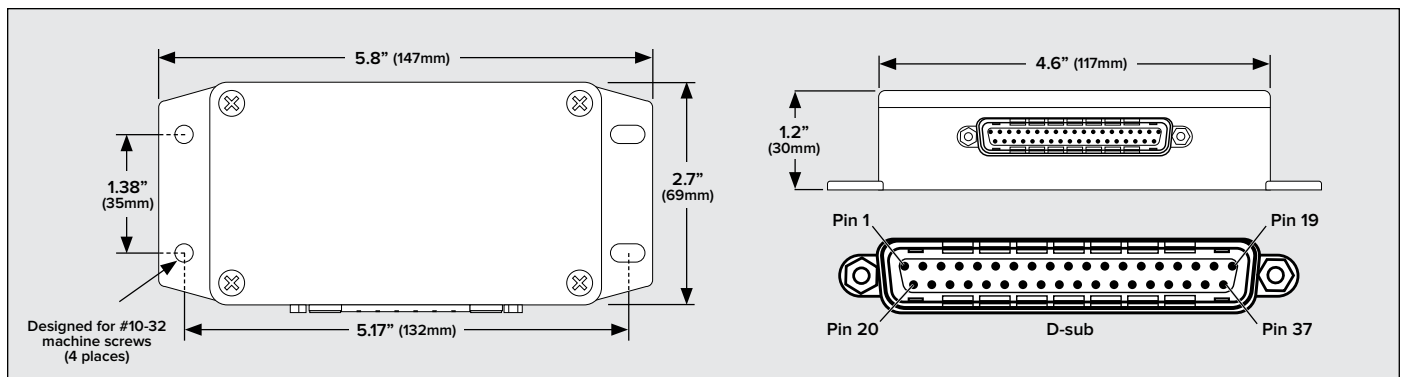
**Connector:** The SR429/1 uses a filtered DC-37P connector to provide 330 pF capacitive coupling per pin to chassis ground for enhanced EMC capability.

**Weight:** 11 ounces (312 grams)

**Grounding:** Unit is required to be grounded to aircraft chassis for ARINC 429 wire shield termination. Bottom surface of mounting tabs are provided as a conductive surface. If grounding is through the attachment bolts #10 internal toothed paint cutting star washer must be used. Low resistance ground bond not required.

**Mounting:** Four #10-32 machine screws (not provided). Internal toothed #10 paint cutting lock washers recommended. Torque to 32 – 35 in-lb. Unit is to be mounted on a flat surface with < 0.04” maximum distortion.

Figure 1: SR429/1 Dimensions



The **SR429/1** is offered in two configurations:

## Pre-configured Unit

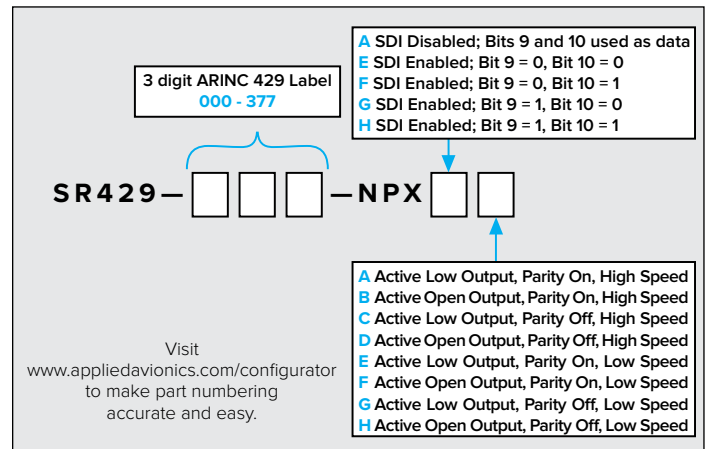
Pre-configured units are factory set to operate on a single specific ARINC 429 label and will be configured with the specific label identified (i.e. SR429-353-NPXAC for ARINC 429 label 353).

### Factory settings include:

- One (1) specific ARINC 429 Label (bits 1-8)
- Active Low or Active Open Output
- Parity Checking (On or Off)
- Use of SDI bits as additional destination information or as additional data (bits 9-10)
- Transmission speed (High speed or Low speed)

Unit is not designed for field access once it has left the factory.

Figure 2: Part Configuration Number - Pre-configured Unit



## Universal Unit

Universal units allow the user to select a specific ARINC label and can be useful in test or troubleshooting. Units can be re-configured for any ARINC label, SDI functionality or speed of transmission. The unit must be ordered with a specific output type (Active Low or Active Open) and parity checking (On or Off).

### How to set a Universal Unit:

- 1) Remove 4 screws in cover plate. Remove cover.
- 2) Locate bank of 12 DIP switches on circuit board.  
See Figure 3.
- 3) DIP switches #1-8 control the primary label address.  
See Table 1.
- 4) DIP switches #9-11 control the use of the Source Destination Identifiers. The setting of DIP switch 11 determines how the settings of DIP switches 9 and 10 are used. See Table 2.
- 5) DIP switch #12 determines the speed of transmission.  
See Table 3.
- 6) Replace cover and tighten 4 screws torqued to 12 in-lb.

Figure 3: Dip Switch Location

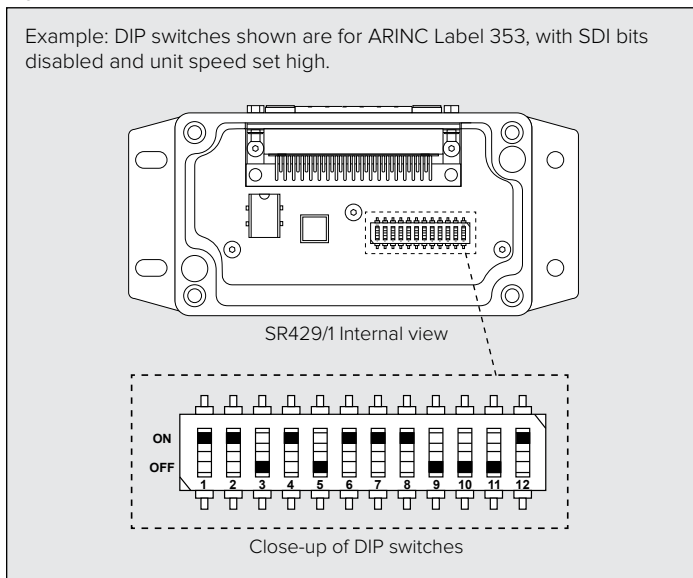


Figure 4: Part Configuration Number - Universal Unit

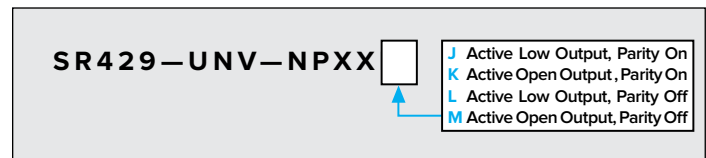


Table 1: DIP Switches #1-8

ARINC Label Char. #1		ARINC Label Char. #2			ARINC Label Char. #3					
Char. #1	DIP 8	DIP 7	Char. #2	DIP 6	DIP 5	DIP 4	Char. #3	DIP 3	DIP 2	DIP 1
0	Off	Off	0	Off	Off	Off	0	Off	Off	Off
1	Off	On	1	Off	Off	On	1	Off	Off	On
2	On	Off	2	Off	On	Off	2	Off	On	Off
3	On	On	3	Off	On	On	3	Off	On	On
			4	On	Off	Off	4	On	Off	Off
			5	On	Off	On	5	On	Off	On
			6	On	On	Off	6	On	On	Off
			7	On	On	On	7	On	On	On

DIP switches 1-8 decode the octal 8 bit ARINC 429 label (i.e. label 353) in a 2-3-3 format  
Off=0; On=1      DIP 8 = MSB, DIP 1 = LSB

Table 2: DIP Switches #9-10

DIP 11	DIP 11 Definition	DIP 9	DIP 10
Off	SDI Disabled, Bits 9 & 10 used as data	Not Used	
On	SDI Enabled, Bits 9 & 10 used as additional sub-label info	Off (0)	Off (0)
		Off (0)	On (1)
		On (1)	Off (0)
		On (1)	On (1)

Table 3: DIP Switch #12

DIP 12	DIP 12 Definition
Off (0)	Low Speed (12.5 kbps)
On (1)	High Speed (100 kbps)

**Table 4: Pinout Table**

Pin Number	Pin Name	Description
1	RXA	Positive connection to ARINC BUS
2	Shield GND	Shield ground for ARINC
3	RXB	Negative Connection to ARINC BUS
4	Shield GND	Shield ground for ARINC
5	Signal GND	Board signal ground (one required for each 3A of output) (12 amp maximum per unit)
6		
7		
8		
9	SD9	SDI Bit 9 value Open drain output (1A maximum)
10	SD10	SDI Bit 10 value Open drain output (1A maximum)
11	Bit 11	Data Bit 11 value Open drain output (1A maximum)
12	Bit 12	Data Bit 12 value Open drain output (1A maximum)
13	Bit 13	Data Bit 13 value Open drain output (1A maximum)
14	Bit 14	Data Bit 14 value Open drain output (1A maximum)
15	Bit 15	Data Bit 15 value Open drain output (1A maximum)
16	Bit 16	Data Bit 16 value Open drain output (1A maximum)
17	Bit 17	Data Bit 17 value Open drain output (1A maximum)
18	Bit 18	Data Bit 18 value Open drain output (1A maximum)
19	Bit 19	Data Bit 19 value Open drain output (1A maximum)
20	Bit 20	Data Bit 20 value Open drain output (1A maximum)
21	Bit 21	Data Bit 21 value Open drain output (1A maximum)
22	Bit 22	Data Bit 22 value Open drain output (1A maximum)
23	Bit 23	Data Bit 23 value Open drain output (1A maximum)
24	Bit 24	Data Bit 24 value Open drain output (1A maximum)
25	Bit 25	Data Bit 25 value Open drain output (1A maximum)
26	Bit 26	Data Bit 26 value Open drain output (1A maximum)
27	Bit 27	Data Bit 27 value Open drain output (1A maximum)
28	Bit 28	Data Bit 28 value Open drain output (1A maximum)
29	Bit 29	Data Bit 29 value Open drain output (1A maximum)
30	Bit 30	SSM Bit 30 value Open drain output (1A maximum)
31	Bit 31	SSM Bit 31 value Open drain output (1A maximum)
32-35	Reserved	Reserved for future use
36	/MR	Master Reset
37	+28VDC	

**Table 5: Operating Parameters**

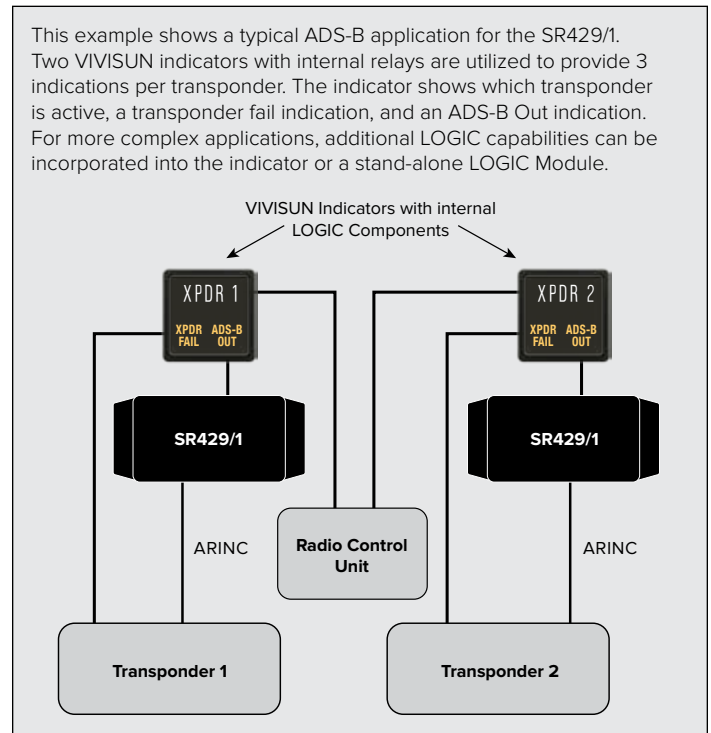
Description	Parameters
<b>Operating Parameters</b>	
Operating Voltage (Max./Nom./ Min.)	+32 VDC /+28 VDC/+18 VDC
Power Supply Input Current	8 ma
Reset from power loss	5 s maximum
/Master Reset (active low)	30 ms min
High Level Input Voltage (V <sub>H</sub> )	3 V minimum
Low Level Input Voltage (V <sub>L</sub> )	1.1 V maximum
Low Level Input Current (I <sub>L</sub> )	1 mA maximum
ARINC 429 inputs	Per ARINC 429 specification
Low Level Output Voltage @ 1A (V <sub>OL</sub> )	0.4 VDC typical, 0.6 VDC Max
High Level Output Voltage (V <sub>OH</sub> )	32 VDC maximum
<b>Output Load Capacity</b>	
Resistive/Motor	1.0 A maximum
Lamp/Inductive	0.8 A maximum
Total output current all used outputs	12 A maximum when using all available grounds
Operating life	1,000,000 cycles at 85°C rated loads
<b>Temperature</b>	
Operating / non-operating temperature	-55°C to +85°C/+125°C

**Table 6: Output Level by Configuration**

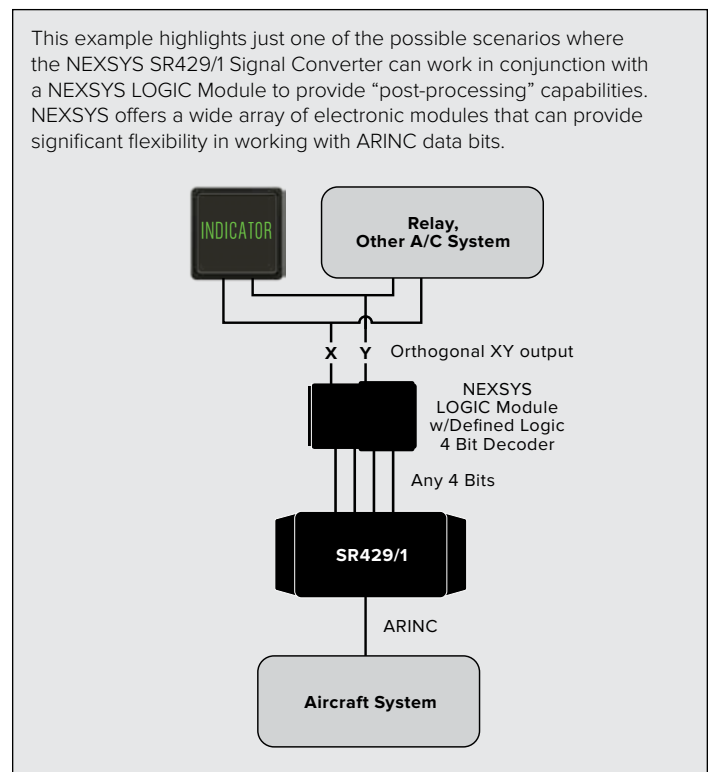
ARINC 429 Word Data Bit	Output Level *	
	Active Low Configuration	Active Open Configuration
0 **	Open (High Impedance)	Ground
1 (Active)	Ground	Open (High Impedance)

\* All outputs are open drain. Outputs have been inverted in Active Open configuration.  
 \*\* Also represents power-up and reset state.

**Example 1: Typical ADS-B application of SR429/1**



**Example 2: ARINC Data Decoder**



**Table 7: Qualification Level Summary**

Test Description	Specification	Section	Category	Reference Levels
Altitude/Over Pressure	RTCA/DO-160 MIL-STD-202 MIL-STD-810	4 105C 500	E1 & A2 C Procedure II	-15,000 feet, +70,000 feet
Temperature	RTCA/DO-160 MIL-STD-810	4 501/502	F2 Procedure III	-55°C and +85°C
Temperature Variation	RTCA/DO-160 MIL-STD-202 MIL-STD-810	5 107 503	S2 A 1	5 cycles -55°C/+85°C
High Temperature Survival (Non-operating)	MIL-STD-202	108A	A	+125°C, 96 hours (Electronic Unit Only)
Humidity (Non-operating) (Non-operating) (Operating)	RTCA/DO-160 MIL-STD-202 MIL-STD-810	6 106 507	B N/A Procedure II	240 hours, +65°C, > 90% RH
Operational Shock and Crash Safety	RTCA/DO-160 MIL-STD-810 MIL-STD-202	7 213 516	B B Procedure IV	20 G Sawtooth 75 G Half-Sine 75 G Half-Sine
Acceleration	RTCA/DO-160 MIL-STD-202 MIL-STD-810	7 212 513	B A Procedure III	20 G, 3 axis
Vibration	RTCA/DO-160 MIL-STD-202	8 204	R,U B	10-2000 Hz, Curves C1 & G 10-2000 Hz, 15 G
Explosive Atmosphere	RTCA/DO-160	9	E	
Drip Proof	RTCA/DO-160 RTCA/DO-160 MIL-STD-810	10 10 506	Y W Procedure III	2 chamber condensing 140 l/m <sup>2</sup> /hr 280 l/m <sup>2</sup> /hr
Sand and Dust	RTCA/DO-160 MIL-STD-202	12 110	D N/A	
Fungus Resistance	RTCA/DO-160	13	F	Compliance by material selection
Magnetic Effect	RTCA/DO-160	15	Z	1° deflection, < 0.3 m
Power Input Aircraft Power	RTCA/DO-160 MIL-STD-704	16 N/A	A & B N/A	200 ms dropout
Spike	RTCA/DO-160 MIL-STD-461	17 CS106	A Spike 1	Power, 600 V, 10 us, 50 ohm 400 V, 5 us, 5 ohm
Audio Frequency Conducted Susceptibility	RTCA/DO-160 MIL-STD-461	18 CS101	Z Curve 1	Power Input, 4V P-P, 1-150 KHz
Induced Signal Susceptibility	RTCA/DO-160	19	CW	20A RMS, 350-800 Hz 5400 V/m, 120 A/m
RF Conducted Susceptibility	RTCA/DO-160 MIL-STD-461	20 CS114	Y Curve 5	300 mA, 10 kHz-400 MHz DO-160 Frequency Set
RF Radiated Susceptibility	RTCA/DO-160 MIL-STD-461	20 RS103	Y 200V/m	200 V/m, 2 MHz-18 GHz DO-160 Frequency Set
RF Emissions	RTCA/DO-160 MIL-STD-461	21 CE102	P	100 MHz - 6 GHz
Damped Sinusoidal Transient (Bulk Cable Injection)	RTCA/DO-160 MIL-STD-461	22 CS116	K33 N/A	Waveform 3, 600 V, 1 MHz, 10 MHz 0.01 - 100 MHz, 1 - 10 A
Lightning Induced Transient	RTCA/DO-160 MIL-STD-461	22 CS115	B3K3L3** N/A	Waveform 5A, 300 V, 120 us 30 ns, 5 amp
Electrostatic Discharge	RTCA/DO-160	25	N/A	15,000 V, 150 pf, 330 ohms
Flamability	RTCA/DO-160 UL-94	26 N/A	C V-0	Metal Housing - No Vent Openings Per UL-94 Flamability

\*Actual testing meets or exceeds defined test conditions.

\*\*For pin injection, all pins achieve level B3K3L3 except Pins 1 & 3 (RXA & RXB) which achieve level B2K3L3.

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