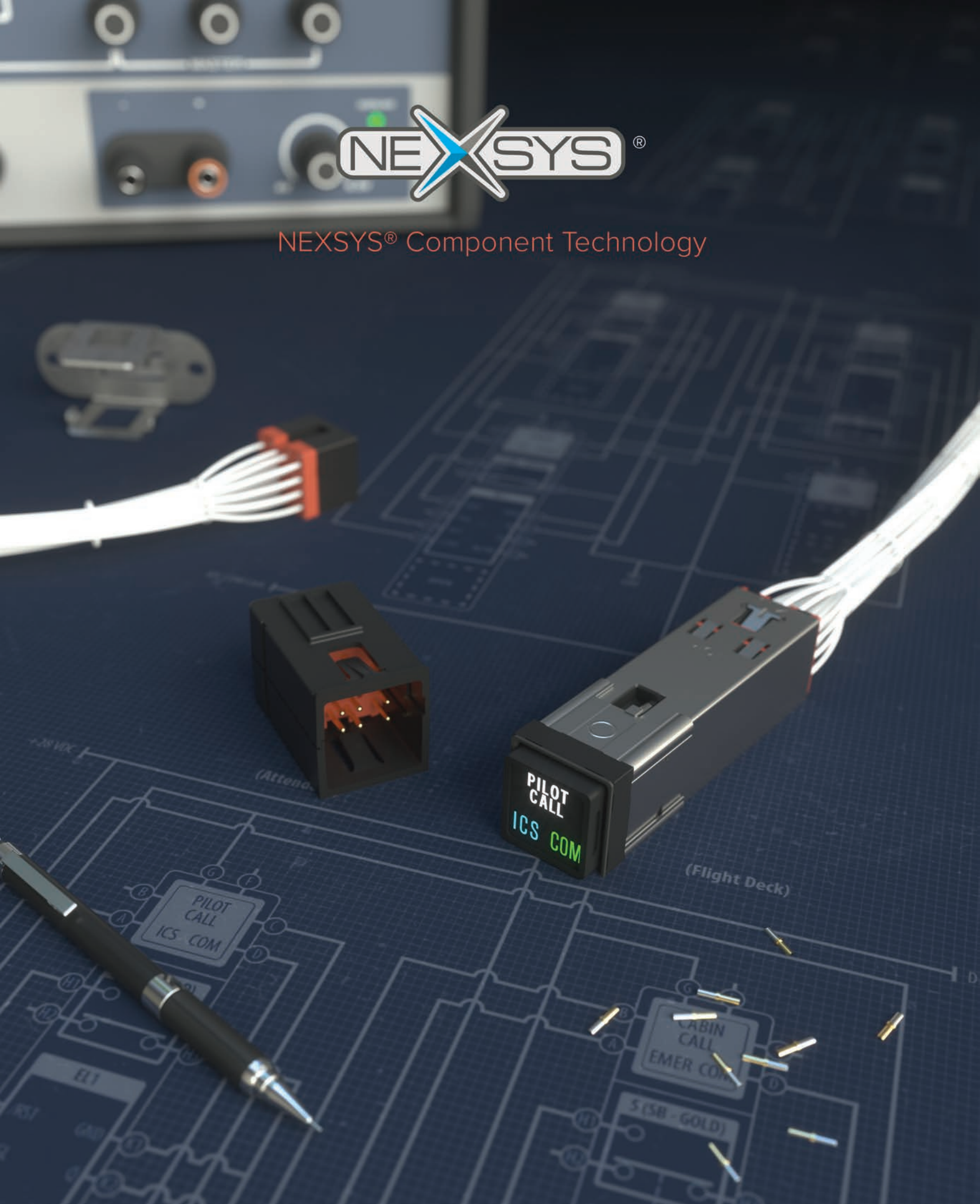


NEXSYS® Component Technology

Manufactured by
Applied Avionics

Applied Avionics

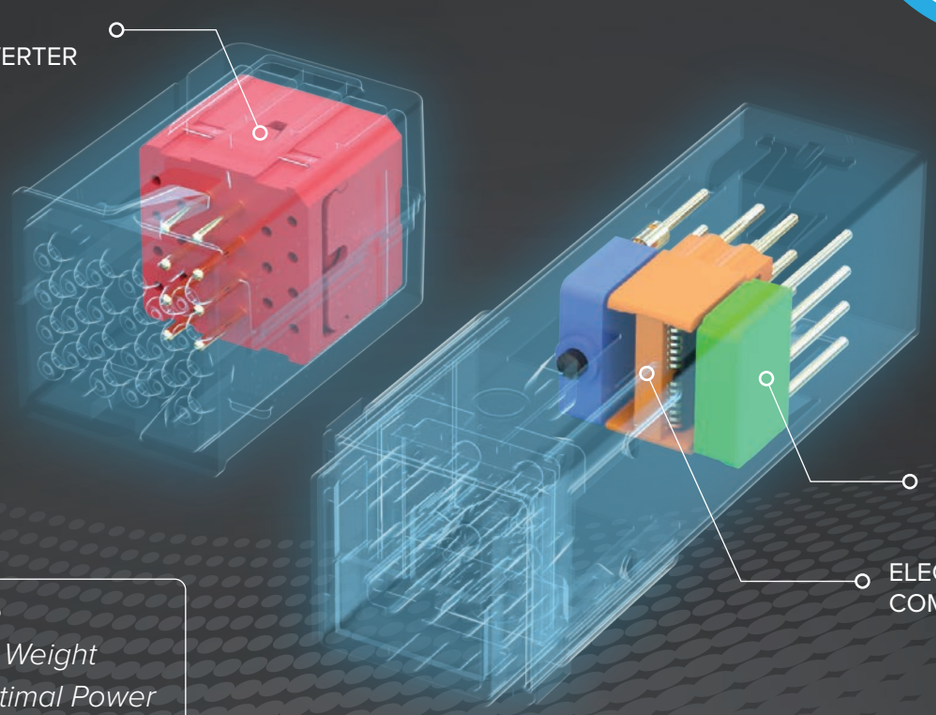
Applied Avionics is the designer and manufacturer of VIVISUN Advanced Lighted Pushbutton Switches and Indicators and NEXSYS Avionics Interface Solutions.

Based in Fort Worth, Texas, Applied Avionics has focused on reliable and innovative solutions serving the aviation, aerospace, and military industries for over 50 years.

NEXSYS® Component Technology

NEXSYS Component Technology provides avionics system design engineers the ability to design custom electronic solutions directly inside VIVISUN Advanced Lighted Pushbutton Switches and Indicators and behind-the-panel NEXSYS Modules.

12
NEXSYS
Component Options

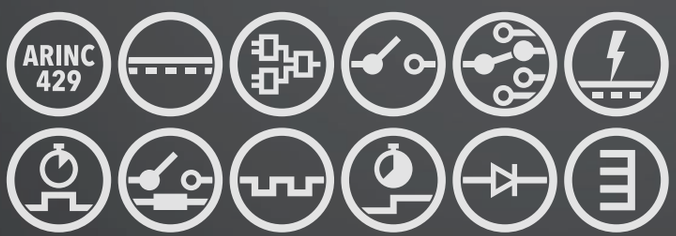


Optimal Size
Optimal Weight
Optimal Power

No Software
No Firmware

Custom Solutions Powered by NEXSYS® Component Technology

Create tailored system-to-system integration solutions directly inside of NEXSYS Modules and VIVISUN switches and indicators using NEXSYS Component Technology. Twelve unique NEXSYS solid-state components provide functionality that includes internal ARINC 429 converters, latching flip-flops, Boolean logic gates, relays, and timers. Our in-house application engineers can assist in specifying parts that meet your exact design requirements.



MIL-SPEC Qualified and DO-160 Tested

NEXSYS products are manufactured by Applied Avionics in our AS9100 certified facility in Fort Worth, Texas ensuring exceptional quality and superior performance. NEXSYS components, in VIVISUN switches and indicators, are fully qualified to MIL-PRF-22885 and are listed on the Qualified Products List (QPL). NEXSYS parts are also tested to the electrical, environmental, and electromagnetic specifications of RTCA/DO-160 and receive 100% performance verification prior to shipment.

Easy Online Part Configuration and Exceptional Customer Service

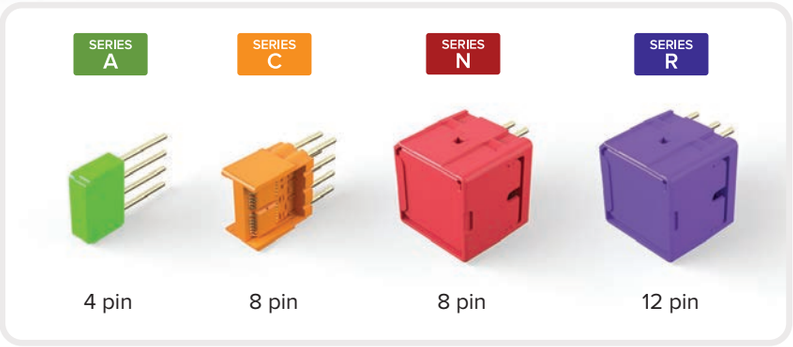
Specifying NEXSYS and VIVISUN part numbers is easy using the Applied Avionics Part Configurator. Our secure, online system allows users to instantly generate part numbers and download a detailed specification sheet. Inquiries are answered directly by knowledgeable sales personnel and our paperless quotation process ensures timely and accurate order processing.

www.appliedavionics.com/configurator

NEXSYS® Components

NEXSYS Component Technology is comprised of a family of 12 unique electronic components. Most components have numerous configuration options useful in a wide array of applications. When used together, NEXSYS components offer millions of custom design solutions.

Each NEXSYS component is either: a 4 pin device, **Series A** (*shown in green*); an 8 pin device, **Series C** (*shown in orange*) or **Series N** (*shown in red*); or a 12 pin device, **Series R** (*shown in purple*). In addition to the number of pins, the series designation relates to the physical size of the component.



NEXSYS® Component Summary

NEXSYS Component Technology offers a number of electronic components that can perform complex switching, logic, timing and sensing functions. Solid-state active NEXSYS components are surge suppressed, diode isolated, buffered and debounced for reliable operation. These components can be utilized alone or wired together to provide custom control circuits inside a VIVISUN body or NEXSYS Module.

ARINC 429 Signal Converters

SERIES N or SERIES R

ARINC 429 signal converters receive one to four data bits from a single label and convert the data into discrete outputs. Additional options include a binary decode of two or three bits and a binary decode of SSM bits. Converters feature internal failure monitoring (Heath/Watchdog) to activate FAIL outputs upon failure detection. ***See page 4.***

Electronic Latch

SERIES C

Orthogonal (i.e. flip-flop circuit) and Blink (1 Hz) outputs controlled by Toggle, Set, and Reset inputs. ***See page 6.***

Electronic Rotary

SERIES C

Sequentially increments through a loop of up to four latched (active) output states. An active state can be reset by an external input or cycling unit power. ***See page 6.***

Solid State Relay

SERIES A or SERIES C

Single and Combination Normally Open (NO), and Normally Closed (NC) solid-state switching, available in three voltages (Single SSR) with Opto-isolated inputs and outputs for circuit buffering. ***See page 7.***

DC Voltage Sensor

SERIES A

DC voltage sensing input that is triggered by an under or overvoltage setpoint. The input options range from +50 mVDC to +48 VDC. For voltages up to +1.0 VDC, the Voltage Sensor may be used as a current sensor when combined with an external shunt resistor. ***See page 8.***

Current Sensor

SERIES A

Current sensing input with integrated resistance that triggers an active output when a DC under or overcurrent setpoint (10 mA to 1 A) is exceeded. ***See page 8.***

Pulse/Timer

SERIES C

Dual-channel, independent outputs, each triggered by a specified edge transition (falling/rising) detected by the Inputs. Each channel produces a “one-shot” pulse output. ***See page 9.***

Time Delay

SERIES A

Time Delay active output that features options ranging from 125 ms to 4 hrs. Input trigger options include Ground, High Impedance, +28 VDC or unit power up. ***See page 9.***

Defined Logic (Boolean)

SERIES C

Digital Boolean logic gates that provide multiple channels, cascaded levels, and binary decode solutions for electronic signals. ***See page 10.***

Square Wave Oscillator

SERIES A

Externally controlled square wave oscillator with frequency options ranging from 0.25 Hz to 500 Hz. The output signal oscillates between High Impedance and Ground. Input trigger options include Ground and +28 VDC. ***See page 11.***

Diode Pack

SERIES A

Two independent diodes packaged together to increase design efficiency, provide sneak path isolation, and diode logic gate functions. ***See page 11.***

Terminal Block

SERIES A

Four interconnected terminals that can occupy any open switch/indicator or module position, increasing design efficiency by minimizing external splices. ***See page 11.***

NEXSYS® Component Configurations

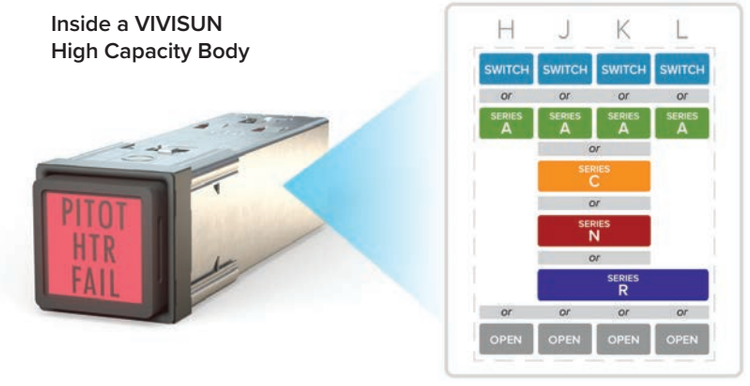
NEXSYS Component Technology is available inside VIVISUN switches and indicators, as well as inside NEXSYS Modules. NEXSYS components are also available as a stand-alone Thru-hole device.

VIVISUN® Switch and Indicator Configurations

NEXSYS Component Technology is available in VIVISUN Compact or High Capacity switch and indicator bodies. Inside a VIVISUN switch body, NEXSYS components will occupy positions that are not already occupied by an electromechanical switch.

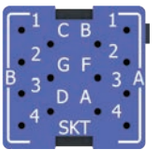
Inside a VIVISUN Compact Body

Inside a VIVISUN High Capacity Body



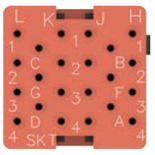
VIVISUN Compact bodies have two available positions (A and B in the diagram above). Compact bodies can contain up to two Series A components. An electromechanical switch pole can be used in place of a Series A component. Compact bodies cannot accommodate Series C, Series N or Series R NEXSYS components. Unoccupied positions will be configured with an Open spacer.

Compact bodies with NEXSYS components require the use of a keyed NEXSYS Connector Plug, P/N 18-442 (*shown*).



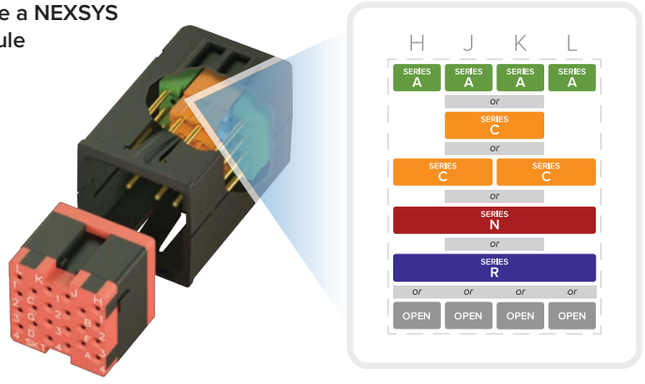
VIVISUN High Capacity bodies have four available positions (H, J, K, and L in the diagram above). High Capacity bodies can contain (a) up to four Series A components; (b) a single Series C or Series N component with up to two Series A components; or (c) a single Series R component with a single Series A component. An electromechanical switch pole can be used in place of a Series A component. Unoccupied positions will be configured with an Open spacer.

High Capacity bodies with NEXSYS components require the use of a keyed NEXSYS Connector Plug, P/N 18-440 (*shown*).



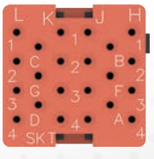
NEXSYS® Module Configurations

Inside a NEXSYS Module



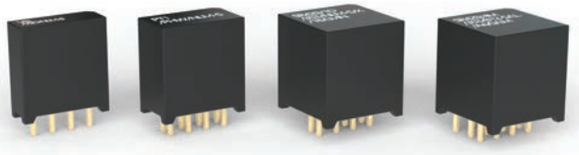
NEXSYS Modules have four available positions (H, J, K, and L in the diagram above). Modules can contain (a) up to four Series A components; (b) a single Series C component with up to two Series A Components; (c) two Series C components; or (d) a single Series N or Series R component. ***See page 12.***

Modules require the use of a keyed NEXSYS Connector Plug, P/N 18-440 (*shown*).



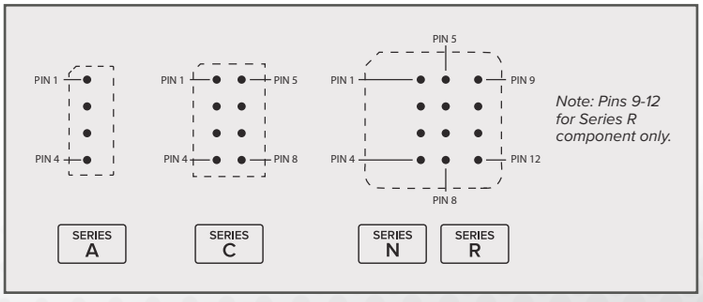
Thru-hole Devices

For applications where a circuit board is being utilized to satisfy electronic design requirements, individual NEXSYS components can be provided as a Thru-hole device.



Series A Series C Series N Series R

Part numbers are laser marked on the top of each component for easy identification after installation. Solderable pins (0.025" diameter) are designed to be compatible with 0.062” to 0.093” thick circuit boards.



ARINC 429 Signal Converter (SR429/1M, /4M, /4D)

Summary Description

The NEXSYS ARINC 429 Signal Converter is a Series N (8 pin) or Series R (12 pin) autonomous ARINC 429 receiver that includes the protocol logic necessary to capture and convert a 32-bit ARINC 429 data word into a discrete output. The unit can also assist with encoding applications by performing a multi-bit decode operation.

The NEXSYS Signal Converter is available in three configuration types: Single-Bit Converter (SR429/1M), Multi-Bit Converter (SR429/4M), and Multi-Bit Decoding Converter (SR429/4D) based on the requirements for data conversion and output control.

The NEXSYS ARINC 429 Signal Converter offers a more efficient design than larger adapter boxes, which introduce significantly more cost and complexity than is practical for straightforward applications. The simple input-pin interface does not rely on any microcontroller software or firmware control, eliminating qualification requirements to DO-178 or DO-254.

Standard Input Characteristics

28V: Operating voltage (nom.), 8 mA current draw (max.)

GND: Continuous Ground required.

RXA, RXB: Receive (RX) ARINC 429 unit of transmission (TX). Signal Converters have options for specifying the label (000-377), the bit or multiple bits to be used for driving active outputs (see below), enabling/disabling SDI bits (9, 10) for valid data source identification, enabling parity checking, and specifying high or low-speed transmission.

Standard Output Characteristics

The three NEXSYS Signal Converter configuration types (SR429/1M, SR429/4M, and SR429/4D) provide up to three distinct output control activation options; Discrete Outputs, Decoded Outputs and the Failure Output (see below).

All outputs are open-drain (High Impedance) when not active. The output load capacity is 1.0 A (Resistive) for the SR429/1M and 0.5 A (Resistive) for SR429/4M and SR429/4D.

Discrete Outputs - Active outputs are converted from one or more of the actual bits in the ARINC 429 data word. Converted single bits (SR429/1M) and multiple bits (SR429/4M) can be active outputs and are specified as High Impedance when data bit = 1 (Standard) or Ground when data bit = 1 (Inverted). When data bit = 0, the output is orthogonal to the specified level when data bit = 1.

Decoded Outputs - Active outputs can also represent the decoding of multiple bits. Options for Decoded Outputs include the decoding of two or three data bits (SR429/4D) and the decoding of the Sign/Status Matrix bits (30, 31) available in the SR429/4M. Active Decoded Outputs can be specified as Ground or High Impedance when the decoded condition equals *TRUE*.

Failure Output - The internal IC health can be monitored and produce an active output upon failure of the receiver IC and/or failure to receive valid ARINC data within a specified time buffer (0.5 – 15 sec.). Buffering prevents inadvertent failure warnings due to normal signal chatter. This option also monitors loss of power.

The Failure Output becomes active upon failure of the receiver IC and can be specified as either:

Fail = High Impedance (Health), Normal = Ground

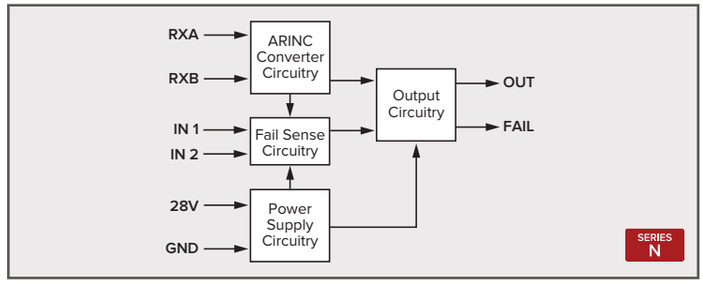
Fail = Ground (Watchdog), Normal = High Impedance

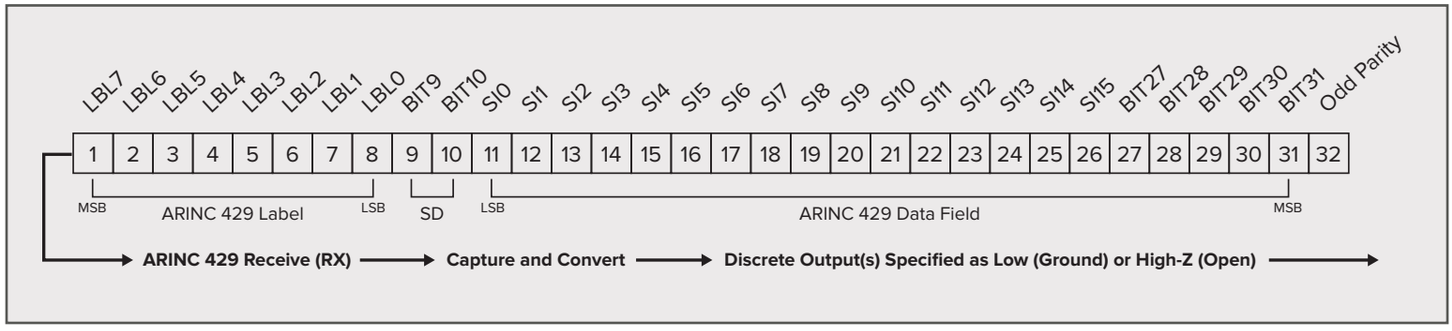
In the SR429/1M Signal Converter, only the Health version of the Failure Output is available which can be enhanced by combining additional external failure warnings into one active output.

SR429/1M Single-Bit Converter

The SR429/1M Single-Bit Converter is a Series N (8 pin) device that offers one Discrete Output (OUT) from a single label and bit and one output (FAIL) that activates when the Fail Sense Circuitry detects a failure condition.

The Fail Sense Circuitry drives the FAIL output and can optionally combine the internal Failure Output signal (Health) from the IC with up to two external sources. IN 1 and IN 2 are inputs to the Fail Sense Circuitry with predefined failure signal definitions. The FAIL output of the SR429/1M is defined as Fail = High Impedance and Normal = Ground. The Fail Sense Circuitry can be bypassed if unused.

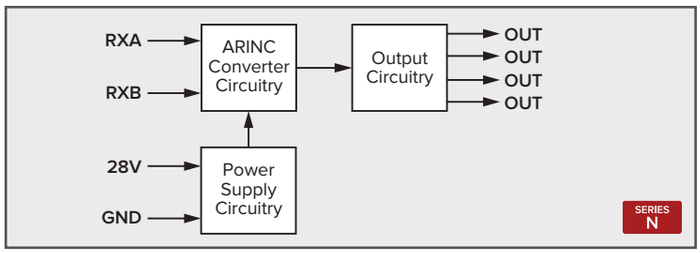




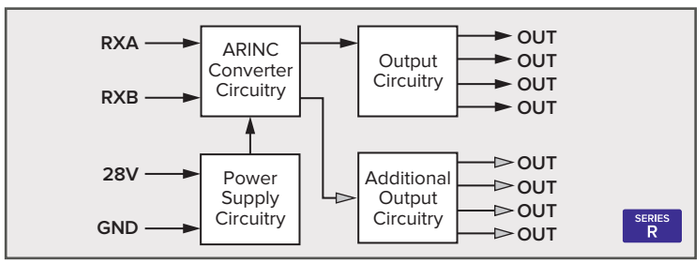
SR429/4M Multi-Bit Converter

The SR249/4M features the ability to convert up to four different data bits into active Discrete Outputs. Additional options include a Decoded Output of the Sign/Status Matrix (SSM) bits 30 and 31 and inclusion of Failure Outputs.

Series N (8 pin) SR429/4M: Four primary outputs can be Discrete Outputs or Failure Outputs, active on four separate pins. These Discrete Outputs and Failure Outputs can also be repeated within the four available outputs to avoid external splicing.



Series R (12 pin) SR429/4M: In addition to the four primary outputs detailed above for the Series N SR429/4M, the Series R SR429/4M adds four additional outputs to the four primary outputs. Options for the four additional outputs include Discrete Outputs (inverted outputs based on the bits used in the primary outputs), Failure Outputs, or Decoded Outputs from decoding the Sign/Status Matrix (SSM) bits 30 and 31. The SSM binary decode 00 can be repurposed as a Discrete or Failure Output.

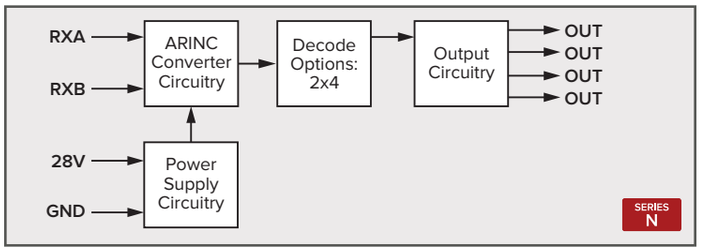


SR429/4D Multi-Bit Decoding Converter

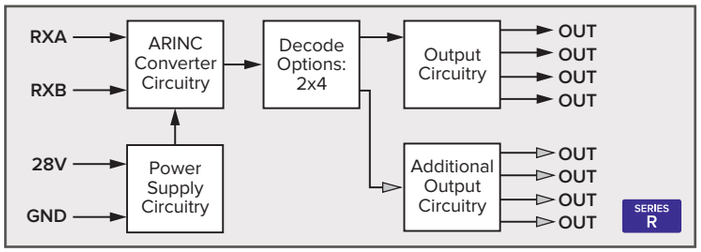
The SR249/4D features Decoded Outputs resulting from a multi-bit binary decode of two or three bits.

SR429/4D with 2x4 Decoder

Series N (8 pin) SR429/4D: The decoding of two bits (2X4) producing four Decoded Outputs. Binary decodes 00 and/or 11 can be repurposed as Discrete or Failure Outputs.

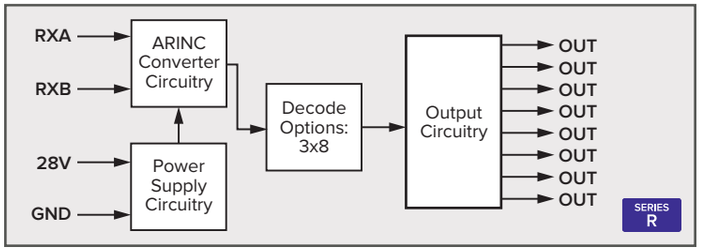


Series R (12 pin) SR429/4D: The decoding of two bits (2x4) producing four Decoded Outputs plus two Discrete Outputs based on decoded input and two unrelated Discrete or Failure Outputs for a total of eight outputs.



SR429/4D with 3x8 Decoder

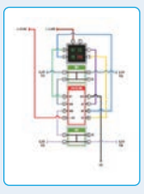
Series R (12 pin) SR429/4D: The decoding of three bits (3x8) producing eight Decoded Outputs. Binary decodes 000 and/or 111 can be repurposed as Discrete or Failure Outputs.



Application Example

Autopilot Status Indication

This application depicts an autopilot system status indicator with a built-in Multi-Bit Converter. The converter reads the ARINC 429 data and decodes the selected label and bits. Each bit has a dedicated output which when active, illuminate indicators that correspond to the active status of the autopilot system.

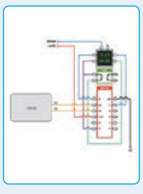


Scan for Full Details

Application Example

WAAS Approach

This application depicts a WAAS Approach indicator with a built-in Multi-Bit Decoding Converter. Once decoded, the data is output as separate discrete signals that are used to illuminate indicators which correspond to the current level of service.

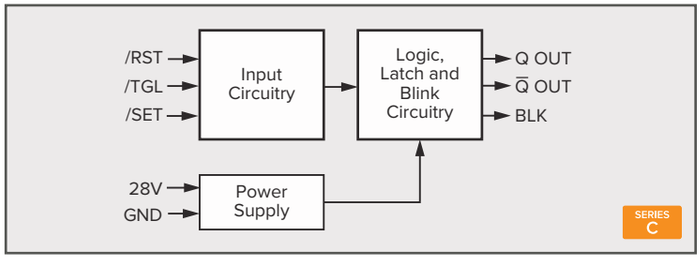


Scan for Full Details

Electronic Latch

Summary Description

The NEXSYS Electronic Latch (EL1, EL2) is a Series C (8 pin) electronic circuit with multiple trigger modes that activate orthogonal (flip-flop) switching between two known states.



Input Characteristics

28V: Operating voltage (nom.), 4 mA current draw (max.).

GND: Continuous ground required.

/RST: immediate activation to reset (/RST) state.

/TGL: Detects signal transitions, which function as the control interface to drive outputs.

/SET: immediate activation to set (/SET) state.

Output Characteristics

Q, $\overline{Q}$: Open-drain outputs are Ground when active and High Impedance when not active. Power-up state (see Configuration Options) determines initial state of outputs and blink (BLK). The output load capacity is 2.0 A (Resistive).

BLK: Open-drain output that produces a 1 Hz square wave (50% duty cycle) signal when active and is High Impedance when not active.

Configuration Options

The NEXSYS Electronic Latch is available in two options based on desired power-up state with no inputs active.

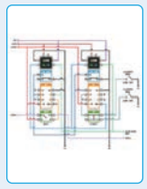
Electronic Latch 1 (EL1): Powers up with Q output at High Impedance, $\overline{Q}$ at Ground and BLK inactive (High Impedance).

Electronic Latch 2 (EL2): Powers up with Q output at Ground, $\overline{Q}$ at High Impedance and BLK active (oscillating).

Application Example

ICS Cabin Call/Flight Deck Isolate

This application details an aircraft internal communication system (ICS). The design provides flexibility that allows flight deck to isolate from cabin audio, while still allowing the cabin to initiate a call.

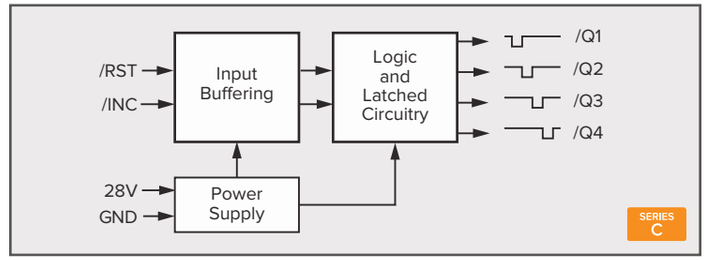


Scan for Full Details

Electronic Rotary

Summary Description

The NEXSYS Electronic Rotary (ER1) is a Series C (8 pin) electronic rotary controller that provides incremental cycling through a loop of four latched output states. The increment signal can come from successive switch closures or from a remote source.



Input Characteristics

28V: Operating voltage (nom.), 4 mA current draw (max.).

GND: Continuous ground required.

/INC: Detects signal transitions, which function as the control interface to loop through four outputs.

/RST: immediate activation to reset (/RST) state. /INC input has no effect when /RST is held low.

Output Characteristics

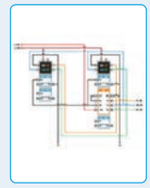
/Q1, /Q2, /Q3, /Q4: Open drain outputs are High Impedance becoming Ground when output is active. Only one output is active at a time. The output load capacity is 2.0 A (Resistive).

The Electronic Rotary powers-up in a known state (Q1 Active). Following power-up, the /INC input will detect a signal transition, and successive transitions will activate the next sequence in a loop of four latched outputs. The number of latched outputs are reduced by wiring the next output state back to /RST (i.e., wiring Q4 to /RST creates a three-state rotary device).

Application Example

LED Annunciator, Off/Dim/Bright

This application details a circuit that turns indicators OFF/ON and adjusts their brightness with the press of a momentary switch. The latched outputs can be used to control relays or toggle discrete dimming inputs to indicators.



Scan for Full Details

Solid State Relay (SSR1, SSR2, SSRC)

Summary Description

The NEXSYS Solid-State Relay (SSR) includes Series A (4 pin) and Series C (8 pin) components that afford custom digital and analog signal control, as well as audio and data switching. The SSR performs similar functions of a standalone mechanical relay without the challenges of external packaging. The broad operating voltage range affords its use in numerous applications from simple polarity reversal to logic gate functions including *AND*, *OR*, and *BUFFER*.

Input Characteristics

Solid State Relays are activated by applying a DC voltage across the inputs. The SSR control bridge is bi-directional, which allows DC voltages to be applied in either direction for polarity insensitive design flexibility. There are three nominal voltage input options for the Series A (Single SSR) device and one input voltage for the Series C (Combination SSR) device, as described below.

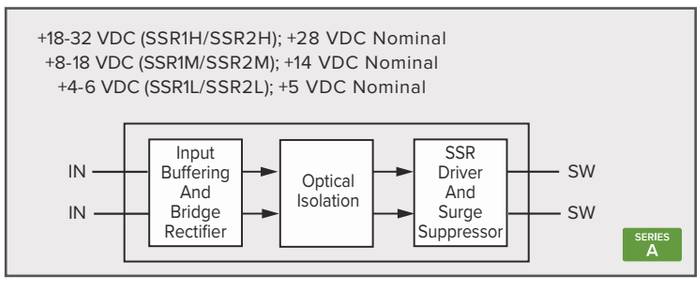
Output Characteristics

NEXSYS Solid-State Relay outputs refer to the solid-state switch, which is available as Normally Open (NO) and Normally Closed (NC). The output load capacity of the NO option is 0.75 A (Resistive), and the NC option is 0.25 A (Resistive).

The number of outputs specified per unit varies as described below.

Single SSR (SSR1, SSR2)

Series A (4 pin) single SSRs are available in Normally Open (SSR1) and Normally Closed (SSR2) versions. Both SSR1 and SSR2 have three nominal input voltage options; Low (+5 VDC), Med (+14 VDC), and High (+28 VDC). The current draw of the three voltage options are 12.1 mA (+5 VDC), 6.2 mA (+14 VDC), and 6.3 mA (+28 VDC).

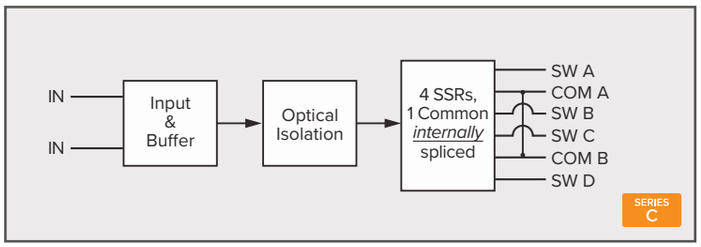


Combination SSR (SSRC)

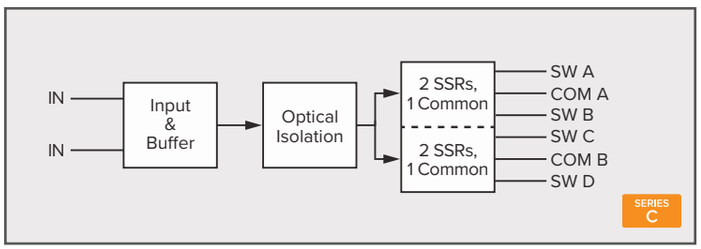
Series C (8 pin) combination SSRs allow for four individual switches (SW) to be synchronized in three different combinations (described below) when +28 VDC is applied across the inputs. For each of the combinations, the switches can be specified to be Normally Open (NO) or Normally Closed (NC). The current draw is 25.2 mA (+28 VDC).

As a Series C device, Combination SSRs cannot be packaged in a VIVISUN Compact body.

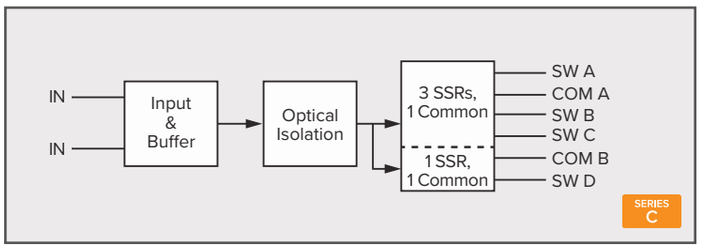
Four Switch Single Common: Four (4) SPST contacts (or switches) with a single internally spliced common.



Dual Switch Pair: Four (4) SPST contacts (or switches) in two pairs connected with one common per pair.



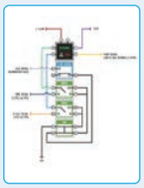
Three Switch Single Common, One Switch Single Common: Three (3) SPST contacts (or switches) connected to one common and one (1) SPST contacts (or switches) connected to another common.



Application Example

Cabin Call with Signal Invert

This application diagram depicts an aircraft internal communication system (ICS) cabin call switch that can initiate a call and indicate system state. The switch can take external input signals of different voltage levels and invert them to provide active system state indication.

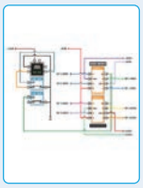


Scan for Full Details

Application Example

Audio Switching

This application diagram depicts an indicator that selects and indicates the active audio source as determined by the position of the built-in alternate action switches. The switches control external relays which allow signals of the selected audio source to be sent to downstream systems.

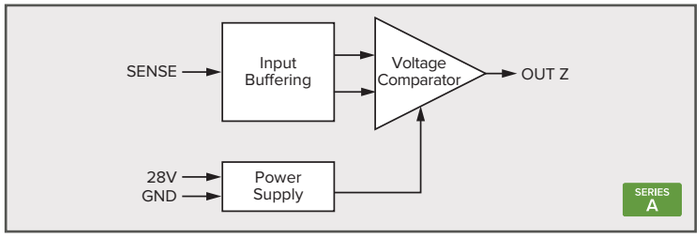


Scan for Full Details

Voltage Sensor

Summary Description

The NEXSYS Voltage Sensor (VSD1, VSD2) is a Series A (4 pin) solid-state, direct current (DC) voltage sensor, developed to detect undervoltage and overvoltage conditions. The Voltage Sensor features fault-tolerant circuitry and architecture that provides low-drift sensing over the operating temperature range.



Input Characteristics

28V: Operating voltage (nom.), 2 mA current draw (max.) - VSD1, 4 mA current draw (max.) - VSD2.

GND: Continuous Ground required.

SENSE: Detects DC voltage. Voltage sensing includes a hysteresis band to prevent signal chatter.

Output Characteristics

OUTPUT Z: Open-drain output is Ground when active and High Impedance when not active. Output can be specified to activate when SENSE voltage is above or below the specified voltage level. VSD1 output load capacity is 2.0 A (Resistive), and VSD2 is 0.5 A (Resistive).

Configuration Options

The Voltage Sensor is available in two options based on the specified voltage setpoint.

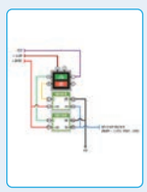
Voltage Sensor 1 (VSD1): Monitors overvoltage and undervoltage at defined setpoints from +1 to +48 VDC. When combined with a NEXSYS Electronic Latch, the Voltage Sensor can create a wide hysteresis solution with separate pull-in and drop-out levels.

Voltage Sensor 2 (VSD2): Monitors overvoltage and undervoltage conditions at defined setpoints from +50 mVDC to +1 VDC. When combined with an external shunt resistor (not included), the VSD2 can detect undercurrent or overcurrent conditions by measuring the voltage drop across the external resistor versus unit Ground.

Application Example

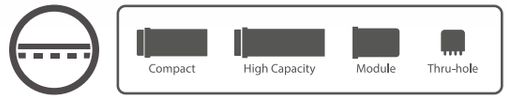
GPS Ready

This application diagram depicts a flight deck GPS status indicator that has built-in voltage sense circuitry. Depending on the voltage level of the status input, the indicator will indicate the active state of the GPS system and equipment.



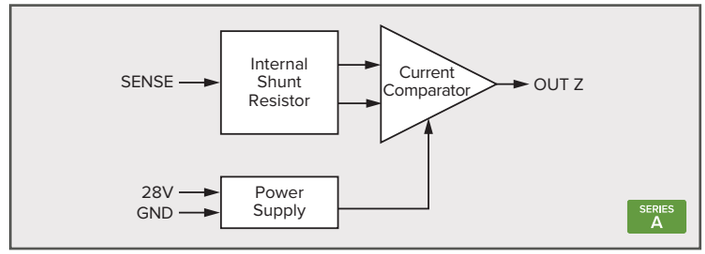
Scan for Full Details

Current Sensor



Summary Description

The NEXSYS Current Sensor (CS1) is a Series A (4 pin) solid-state, low-side direct current (DC) sensor, developed to detect undercurrent and overcurrent conditions. The Current Sensor features fault-tolerant circuitry and architecture that provides low-drift sensing over the operating temperature range.



Input Characteristics

28V: Operating voltage (nom.), 2 mA current draw (max.).

GND: Continuous Ground required.

SENSE: Detects DC current. Current sensing includes a hysteresis band to prevent signal chatter.

Output Characteristics

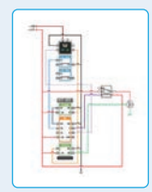
OUTPUT Z: Open-drain output is Ground when active and High Impedance when not active. Output can be specified to activate when SENSE current is above or below the specified current level. The output load capacity is 0.5 A (Resistive).

The NEXSYS Current Sensor monitors overcurrent and undercurrent conditions from 10 mA to 1.0 A. Setpoint options are available in 10 mA increments from 10 to 90 mA and in 50 mA increments from 100 mA to 1.0 A.

Application Example

Pump Load Current Sense

This application depicts a water pump control system, providing the user ON/OFF control via successive switch presses. Alternatively, the system senses the water pump current load and can automatically reset to the OFF state after reaching a set time delay.

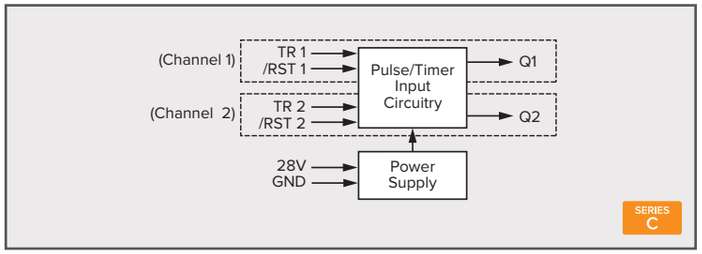


Scan for Full Details

Pulse/Timer

Summary Description

The NEXSYS Pulse/Timer (PT1) is a Series C (8 pin) dual-channel, pulse generator (one-shot) that provides stable retriggerable/resettable operation for timed pulse output applications. The independent channels can also be wired in series to provide a propagation delay for a custom, time-delayed one-shot.



Input Characteristics

28V: Operating voltage (nom.), 4 mA current draw (max.).

GND: Continuous Ground required.

TR1, TR2: Detects a rising or falling edge signal level signal transition which functions as the control interface trigger to drive timed outputs.

RST1, RST2: Immediate termination (reset) of the pulsed output.

Output Characteristics

Q1, Q2: Independent outputs are one-shot drivers and are available with two output options. The defined timing options for the output pulse range from 125 ms to 20 seconds. The output load capacity is 2.0 A (Resistive), per channel.

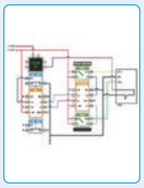
Output = Ground – Normally High Impedance output becomes Ground for a specified time interval (pulse) when the input is triggered by the specified signal level transition.

Output = High Impedance – Normally grounded output becomes High Impedance for a specified time interval (pulse) when the input is triggered by the specified signal level transition.

Application Example

Valve Control and Annunciation

The design converts momentary switch presses into timed pulses to actuate the valve open and closed in an oxygen valve control system. Once the valve is opened, positive indication of oxygen flow is provided via a flow sensor internal to the valve.

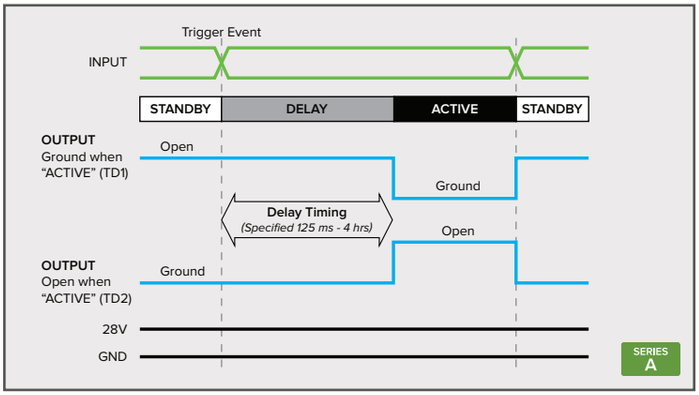


Scan for Full Details

Time Delay

Summary Description

The NEXSYS Time Delay is a Series A (4 pin) device that detects a signal level state change as the event which triggers the delay timer to start. The Time Delay also has the option to start the delay timer upon power-up.



Input Characteristics

28V: Operating voltage (nom.), 4 mA current draw (max.). Device can be specified to start delay timer on power-up.

GND: Continuous Ground required.

INPUT: The INPUT level determines if the device is in STANDBY or DELAY/ACTIVE mode. The device can be specified to transition to DELAY/ACTIVE mode by an INPUT level state change. The INPUT level state options include +28 VDC, High Impedance, and Ground. INPUT is unused when device is specified as a power-up delay timer.

Output Characteristics

OUTPUT: The Time Delay offers two output options, based on the state of the OUTPUT signal when ACTIVE. The specified delay timing options range from 125 ms to 4 hours. The output load capacity is 0.5 A (Resistive).

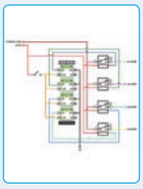
Time Delay (TD1): Ground when ACTIVE and High Impedance when in STANDBY or DELAY.

Time Delay (TD2): High Impedance when ACTIVE and Ground when in STANDBY or DELAY.

Application Example

System Soft Power Startup

This application diagram depicts a power distribution control system with a staggered startup using incremental time delay components. The custom sequential startup pattern ensures that certain units are powered up before others and protects power supplies from transient spikes.



Scan for Full Details

Defined Logic (DL1, DL2, DL3, DL4)

Summary Description

The NEXSYS Defined Logic device consist of four configuration types of a Series C (8 pin) component. The two input / four output devices performs the Boolean logic gate operations *AND*, *NAND*, *OR*, *NOR*, *EXOR*, *EXNOR*, as well as *BUFFER* and *NOT* (Inverter).

Input Characteristics

28V: Operating Voltage (nom.), 4 mA current draw (max.).

GND: Continuous Ground required.

A, B, C, D: Digital electronic inputs that detect logic level signals (1 or 0). Inputs will sense signal levels that are present upon power-up.

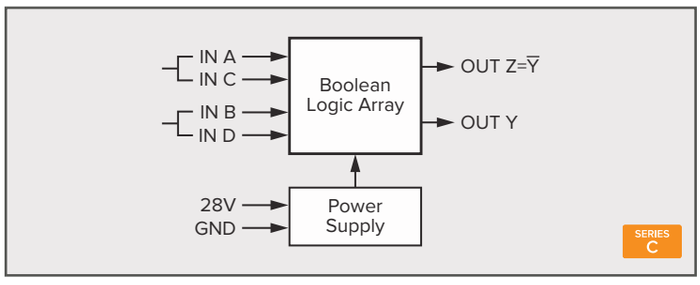
Options include specifying inputs A and C as either Pull-up or Pull-down to define the signal sense levels of a floating input state. For the DL1 variant only, inputs A and C are specified identically (Pull-up or Pull-down) since they are wired together externally. Inputs B and D are factory configured and fixed as Pull-ups.

Output Characteristics

Y, Z: Active outputs are either High Impedance or Ground based on the configured logic gate(s). Outputs Y and Z are orthogonal in DL1, DL3, and DL4 configurations, and are independent for the DL2 configuration. Output load capacity is 2.0 A (Resistive).

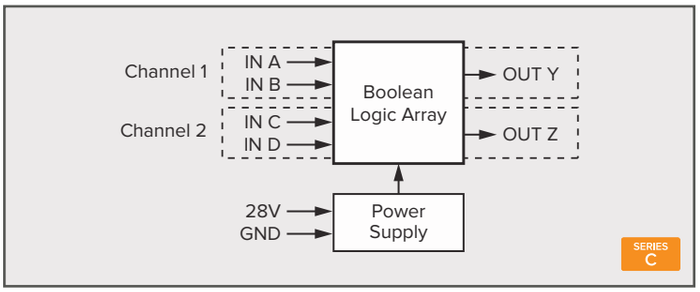
Defined Logic 1 (DL1)

The Defined Logic 1 is a component that offers a decode of two (tied) pairs of four inputs to control two orthogonal outputs to perform as an EXOR or EXNOR logic gate which detects when one signal is active but not both.



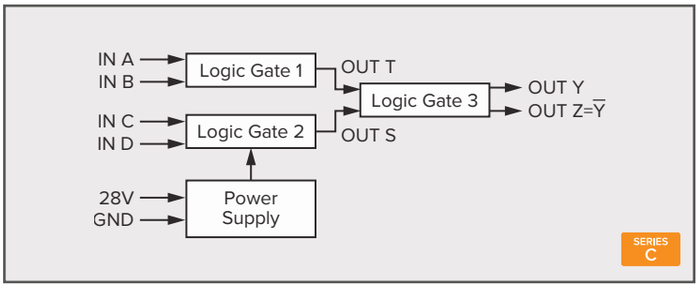
Defined Logic 2 (DL2)

The Defined Logic 2 is a component that offers a decode of two independent logic gates, and each includes two inputs that each control one dedicated output.



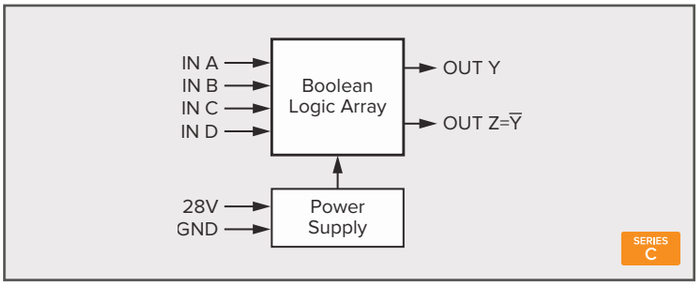
Defined Logic 3 (DL3)

The Defined Logic 3 is a component that offers a decode of two independent logic gates that cascade into a third gate to control two orthogonal outputs.



Defined Logic 4 (DL4)

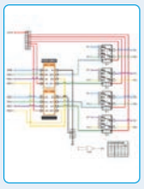
The Defined Logic 4 is a component that acts as a 4 bit binary encoder for up to four inputs controlling two orthogonal outputs.



Application Example

Load Shed

This application diagram demonstrates how a NEXSYS Module, packaged with two Defined Logic (DL2) devices, can perform a multi-channel Load Shed circuit, allowing load priority to be controlled by the power relays, according to system electrical load requirements.

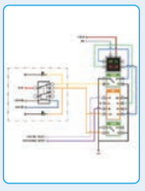


Scan for Full Details

Application Example

Power Converter Status

This application depicts a power converter indicator with ON/OFF, fault, and overheat status indicators that senses power signals from an external mechanical relay to determine the ON and OFF indication states. Discrete signals from the converter are used to indicate fault conditions.

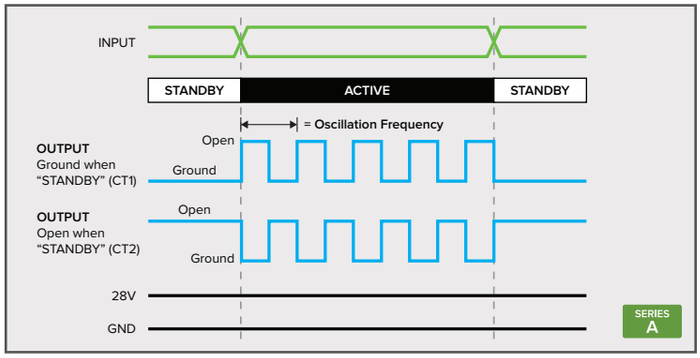


Scan for Full Details

Square Wave Oscillator

Summary Description

The NEXSYS Square Wave Oscillator (CT1, CT2) is a Series A (4 pin) device that detects a signal level state change as the event which triggers output oscillation. The oscillating function will become active based on the state of an input signal level and will persist until the input level is reversed.



Input Characteristics

The NEXSYS Square Wave Oscillator includes the following input characteristics.

28V: Operating Voltage (nom.), 4 mA current draw (max.).

GND: Continuous Ground required.

INPUT: The INPUT level determines if the device is in STANDBY or ACTIVE mode. The device can be specified to shift from STANDBY to ACTIVE on an INPUT state transition from a) +28 VDC to Ground or b) from Ground to +28 VDC.

Output Characteristics

OUTPUT: The Square Wave Oscillator offers two output options based on the state of the OUTPUT signal when device is in STANDBY. The specified oscillation frequency options range from between 0.25 Hz and 500 Hz. The output load capacity is 0.5A (Resistive).

Oscillator (CT1): Ground when STANDBY and oscillating between High Impedance and Ground at specified frequency when ACTIVE.

Oscillator (CT2): Open when STANDBY and oscillating between High Impedance and Ground at specified frequency when ACTIVE.

Application Example

Master Warning Caution

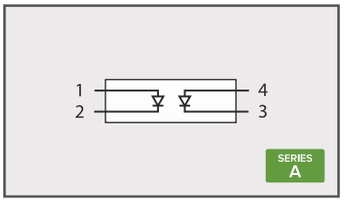
This application diagram depicts a Master Warning & Caution flight deck indicator that has built-in custom blink circuitry. Whenever the internal circuitry senses that the warning and caution signals are active, the respective indicator will blink at the chosen rate.

Scan for
Full Details

Diode Pack

Summary Description

The NEXSYS Diode Pack (DP2C, DP2M) is a Series A (4 pin) dual-diode component that can increase wiring efficiency by replacing external in-line harness diodes. To increase flexibility, both a commercial and a military version of the Diode Pack are available.



Configuration Options

The Diode Pack has two configuration options based on the type of diodes included.

Diode Pack, Commercial* (DP2C): Two 1N6484 glass passivized diodes (Vishay® or equivalent), with a breakdown voltage rating of +1000 VDC.

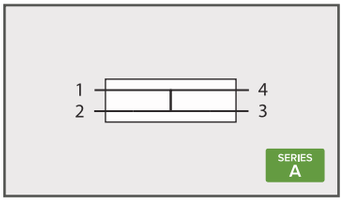
Diode Pack, Military* (DP2M): Two 1N5621JANTX Hermetic glass sealed diodes (Microsemi or equivalent), with a breakdown voltage rating of +880 VDC (Peak).

** Consult the manufacturer's data sheet for detailed diode specifications.*

Terminal Block

Summary Description

The NEXSYS Terminal Block (TB4) is a Series A (4 pin) device that can increase wiring efficiency by eliminating the need for external splices and terminal junction components. The Terminal Block is not available as a Thru-hole device.



The Terminal Block (TB4) is rated at 5.0 A (max.) or 1.0 A (max.) when combined with an ARINC 429 Signal Converter, and provides an ability to bus a single input to three outputs.

NEXSYS® Module

The NEXSYS Module is a ruggedized, small form-factor enclosure that allows avionics system designers to create custom behind-the-panel avionics solutions.

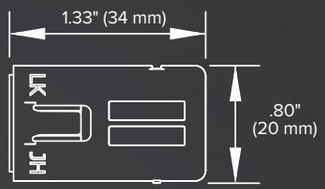
NEXSYS Modules can replace the expense and certification delays that are typically encountered when creating a circuit board to solve design challenges. With three different mounting options, NEXSYS Modules deliver a powerful combination of configurable electronic components in a single robust package designed and tested in accordance with MIL-PRF-22885 and RTCA/DO-160.

NEXSYS Modules can be used as stand-alone devices for solving system-to-system interface challenges. Advanced avionics solutions are possible when NEXSYS Modules are combined with man-machine interface devices such as VIVISUN switches and indicators. There are no limits to the number of switches, indicators or NEXSYS Modules that can be used in an application.

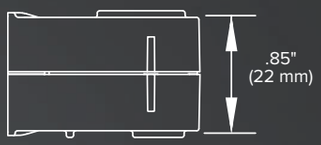
Each NEXSYS Module can accommodate up to four NEXSYS components. *(See page 3 for configuration options.)*

Form Factor

- ***Ruggedized, Small Form-Factor Enclosure for NEXSYS Components***
- ***Includes an In-line Harness Boot or can be bracket or Type 1 rail mounted***
- ***NEXSYS Modules meet the requirements of RTCA/DO-160***



Top View



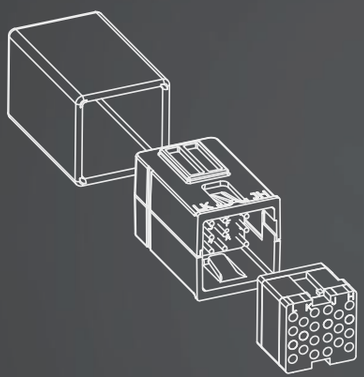
Side View

Mounting Options

A NEXSYS Module can be mounted in the boot provided and secured to the harness using industry standard methods for in-line harness wiring. Additionally, NEXSYS Modules can be mounted in a bracket or in a Type 1 rail.

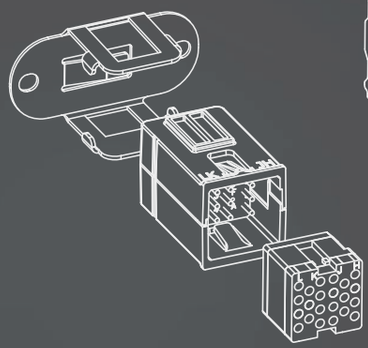
In-line Harness Boot

Included with NEXSYS Module.



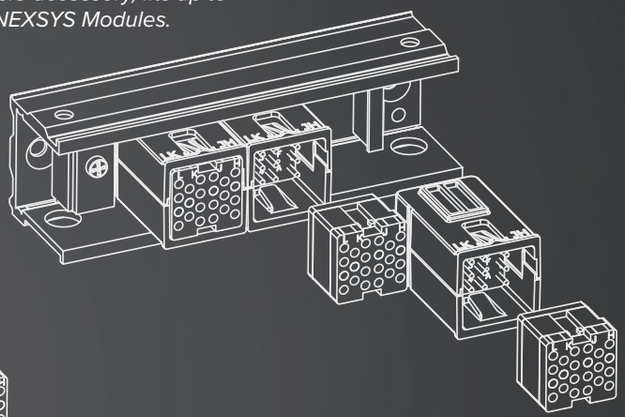
Bracket Mount

Right-angle bracket shown, Flush mount bracket also available.



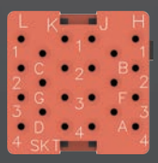
Type 1 Rail

Available accessory, fits up to three NEXSYS Modules.



Termination

NEXSYS Modules require the use of a keyed Connector Plug (*P/N* 18-440). The Connector Plug can be inserted into the module before or after insertion into any of the mounting variations. The Connector Plug can be removed from the Module using an Extraction Tool (*P/N* 18-234) without removing the Module from the mounting.



18-440
NEXSYS
Connector Plug
(For NEXSYS Module)

Performance Summary

Weight (incl. Connector Plug)	Module: 14 gms, Module and Boot: 22 gms, Module and Bracket: 22 gms
Materials	Thermoplastic (Module), Stainless Steel (Bracket), UL V-0 Rated Vinyl (Boot)
Temperature	Operating/Non-operating: -55 C to +85 C
Altitude	-15,000 to +55,000 feet
Salt and Humidity	Humidity: 240 hours, Salt: 96 hours
Shock	20 G Saw tooth, 75 G Half-sine
Vibration	10-2000 Hz 15 G

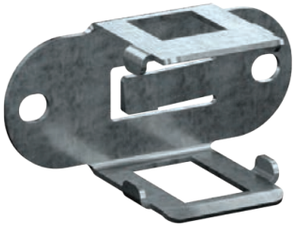
Accessories

NEXSYS® Module Mounting Hardware

22-006
Type 1 Rail
M81714/5-5

22-016
Type 1 Rail, Lightweight
M81714/16-5

22-004
In-line Harness Boot
(included w/ NEXSYS Module)



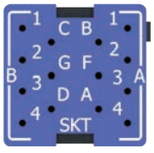
22-005
Right-Angle
Bracket

22-011
Flush Mount
Bracket

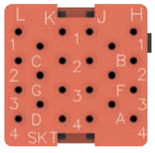
Installation Tools & Connector Plugs

18-234
Connector Plug
Extraction Tool

18-216
Crimp Socket
Wire Removal Tool



18-442
NEXSYS Connector Plug*
(*For Compact VIVISUN bodies with NEXSYS components)*



18-440
NEXSYS Connector Plug*
(*For High Capacity VIVISUN bodies with NEXSYS components and NEXSYS Module)*

**Sealing Plugs included, crimp sockets ordered separately.*

Crimp Sockets

18-219
MIL-C-39029/22-192, Pack of 25
(not included w/ Connector Plug)

Qualifications Summary

The environmental and electrical qualification levels for individual NEXSYS components are summarized in the following tables. Qualification levels apply to all components unless noted otherwise.

Environmental Qualifications

Test Description	Specification	Section	Category	Reference Levels
Altitude	RTCA/DO-160	4	A2, F2	-15,000, +55,000 Feet
	MIL-STD-202	105C	B	
	MIL-STD-810	500	Procedure II	
Temperature	RTCA/DO-160	4	F2	-55°C and +85°C
	MIL-STD-810	501/502	Procedure III	
Temperature Variation	RTCA/DO-160	5	S2	5 Cycles -55° / +85°C
	MIL-STD-202	107	A	
	MIL-STD-810	503	1	
High Temperature Survival (Non-Operating)	MIL-STD-202	108A	A	+85°, 96 Hours (Switch) +125°C, 96 Hours (NEXSYS Modules)
Humidity	RTCA/DO-160	6	B	240 Hours, +38°C/65°C, >90% RH 240 Hours, -10°C/65°C, >90% RH
	MIL-STD-202	106	N/A	
Operational Shock and Crash Safety	RTCA/DO-160	7	B	20 G Sawtooth
	MIL-STD-202	213	B	20G Acceleration, 75 G Half-Sine
	MIL-STD-810	516	V	75 G Half-Sine
Acceleration	RTCA/DO-160	7	B	20 G, 3 Axis
	MIL-STD-202	212	A	
	MIL-STD-810	513	Procedure III	
Vibration	RTCA/DO-160	8	R, U	10-2000 Hz, Sine on Random
	MIL-STD-202	204	B	10-2000 Hz 15 G
Explosive Atmosphere	RTCA/DO-160	9	E	N/A
	MIL-STD-202	109C	B	
Waterproofness (Sealed Switch or Module)	RTCA/DO-160	10	R	450 Litres / Hour 15 Gallons / Minute
	MIL-PRF-22885	4.7.20	Splash-proof	-10°C/+40°C 85%RH
Sand and Dust (Sealed Switch or Module)	RTCA/DO-160	12	D	Silica Media
	MIL-STD-202	110	N/A	
Fungus Resistance	RTCA/DO-160	13	F	Compliance by Material Selection
	MIL-PRF-22885	3.5.2	N/A	
Salt Fog	RTCA/DO-160	14	T	96 Hour Tests
	MIL-STD-202	101	A	
Magnetic Effect	RTCA/DO-160	15	Z	1° Deflection, @ <0.3m

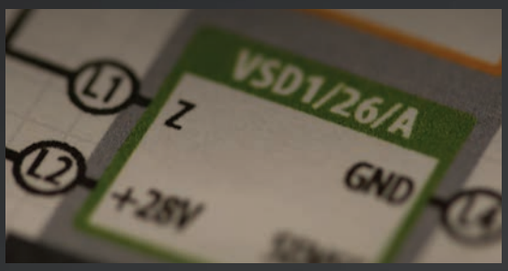
Electrical Qualifications

Test Description	Specification	Section	Category	Reference Levels
Power Input Aircraft Power	RTCA/DO-160	16.6; except as noted below	A and B	
		16.6.1.3 (Momentary Power Interrupt)	A and B	200ms / 50ms dropout (CS, CT, DL, ER, PT, SR429/4, TD, VS)**
			B	50ms dropout (EL, SR429/1)**
			N/A	No digital circuitry. (SSR, TB, DP)**
		16.6.1.5, 16.6.2.2	B	Tests not applicable to Category A
	MIL-HDBK-704-8	LDC (102, 301, 401, 501, 602)	N/A	N/A
Spike / Transient	RTCA/DO-160	17	A	Power 600V, 10µsec, 50 Ohms
Audio Frequency Conducted Susceptibility	RTCA/DO-160	18	Z	Power Input, 4V P-P, 1-150 KHz
	MIL-STD-461	CS101	Curve 2	
Induced Signal Susceptibility	RTCA/DO-160	19	CW	10,000V/m, 120A/m, 350 and 800 Hz
RF Conducted Susceptibility*	RTCA/DO-160	20	Y	300mA, 10KHz-400Hz
	MIL-STD-461	CS114	Curve 5	109dBµA, 10KHz-200MHz
RF Radiated Susceptibility*	RTCA/DO-160	20	Y	200V/m 2MHz-18GHz
	MIL-STD-461	RS103	200V/m	
Conducted RF Emissions	RTCA/DO-160	21	P	150KHz - 152MHz
	MIL-STD-461	CE102	N/A	10KHz - 10MHz
Radiated RF Emissions	RTCA/DO-160	21	P	100MHz - 6GHz
	MIL-STD-461	RE102	N/A	10KHz - 6GHz
Lightning Induced Transient*	RTCA/DO-160	22	XXK3L3	Waveform 3, 600V, 1MHz, 10MHz, Single, Multiple, Burst Waveform 4, 300V, 69µsec Waveform 5A, 300V, 120µsec
	MIL-STD-461	CS117	L1	
Military Transient*	MIL-STD-461	CS115	N/A	5A 30nS 30/Sec for 1 minute
	MIL-STD-461	CS116	N/A	Damped Sinusoidal, 10KHz - 100MHz
Dielectric Withstanding	MIL-STD-202	301		1000 VAC
Electrostatic Discharge	RTCA/DO-160	25	N/A	15,000V, 150pF, 330 Ohms
	MIL-STD-461	CS118	Level 4	

** Stated EMC performance based on tests performed on an individually monitored component using unshielded cables as defined by the applicable EMC test document. The EMC performance of an installed system using NEXSYS components can be dependent on the actual installation environment and interconnection method.*

*** Key to Abbreviations Above:*
CS=Current Sensor, CT=Square Wave Oscillator, DL=Defined Logic, DP=Diode Pack, EL=Electronic Latch, ER=Electronic Rotary, PT=Pulse/Timer, SR429/1=ARINC 429 Signal Converter (/1M), SR429/4=ARINC 429 Signal Converter (/4M and /4D), SSR=Solid State Relay, TB=Terminal Block, TD=Time Delay, VS=Voltage Sensor

NEXSYS® Component Technology



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Including NEXSYS Component Technology in VIVISUN switches and indicators creates an opportunity to design custom control circuits within a familiar form factor.

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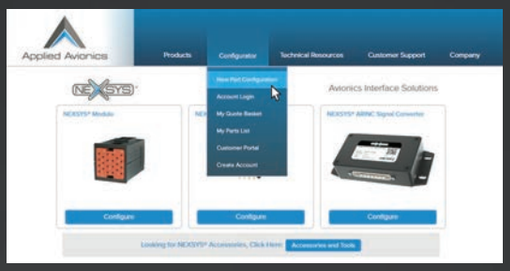

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