

# DTX09501 Series Solid State (m + n)ART™ Automatic Redundancy Transmitter



The DTX09501 Series L-Band 14kW Solid State Transmitter is the first commissioned Mission Critical Radar Transmitter designed with DAICO's (m + n)ART™ - Automatic Redundancy Technology. This revolutionary technology combined with Daico's long-standing Defense Products design / reliability confidently offers a powerful 280kW transmitter. This uniquely configured Transmitter has been operating 24/7 and successfully performed through the infant mortality portion of the Life Cycle Bathtub Curve without any failures since its commissioning!

## Key Features

- L-Band Operation
- 14kW Solid State Power
- (m + n)ART™ Implemented in Driver Amplifier, Power Amplifier, and Power Supply Stages
- 100% Driver Amplifier Redundancy, 11.1% Power Amplifier Redundancy, and 27.3% Power Supply Redundancy
- Single Pulse Failover Mechanism
- Hot Swappable LRUs

## Variable Options

- Frequency Range
- Output Power Level (Up to 280kW)
- Major RF Parameters
- Primary Input (50/60/400Hz, Single/Three Phase, 208V/400V)
- I/O Interface
- Mechanical Configuration
- Environmental Ruggedness

## Applications

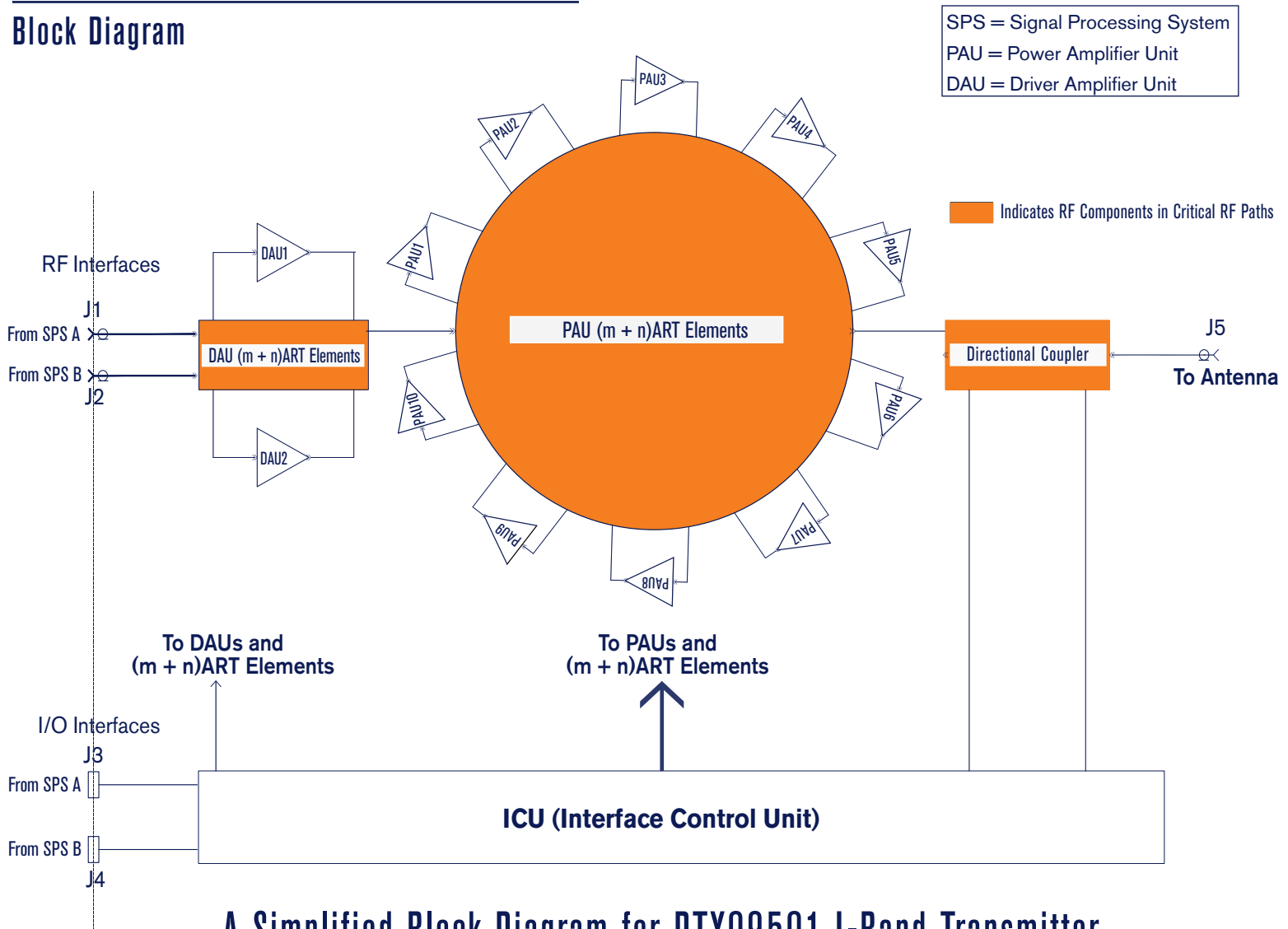
- Surveillance Radar Systems



One DTX09501 Transmitter interfaces with two SPS (Signal Processing System) racks to form a Mission Critical Radar Transmitter System. The Radar remains in service as long as one of two SPS Racks is in normal operation mode. Our decades of Control Products experience and Pulse Amplifier technology provide  $(m + n)$ ART™ transmitters with outstanding pulse quality including pulse-to-pulse stability. More importantly, we know how to prevent amplifiers from being damaged by unpredictable events through our 45 years of RF Control Component design and manufacturing experience.

The introduction of the  $(m + n)$ ART™ Transmitter, DTX09501, revolutionized Mission Critical Radar Transmitter design concepts based on Solid State technologies.  $(m + n)$ ART™ offers the performance, reliability, system MTBCF, system availability, and maintainability oriented technology. The technology is flexible and can be implemented in various frequency bands, power levels, degrees of redundancy, I/O platforms, and environmental conditions. Daico is committed to this technology and is eager to work with our partners to make the world's best transmitter systems with the best transmitter Performance/Cost ratio.

## Block Diagram



A Simplified Block Diagram for DTX09501 L-Band Transmitter

# DTX09501 Transmitter Specifications

	Parameter Description	Value	Unit	Condition
Tx Structure	Transmitter Topology	(m + n)ART™	-	Patent Pending
	PAU Redundancy	11.1%	-	PAU: Power Amplifier Unit
	DAU Redundancy	100%	-	DAU: Driver Amplifier Unit
	Overall PSU Redundancy	27.3%	-	PSU: Power Supply Unit
	Amplifier Technology	SSPA	-	SSPA: Solid State Power Amplifier
Electrical Characteristics	Operating Frequency	1.25 – 1.35	GHz	UHF, S-Band, and C-Band Available
	Output Peak Power	14	kW	Minimum
	RF Input Power	9-13	dBm	Nominal
	RF Input VSWR/Output VSWR	1.3:1/1.3:1	-	Maximum
	Overall Transmitter Efficiency	25%	-	Minimum ( $P_{out\ avg.} / P_{in\ AC}$ )
	Pulse Width	120	µs	Maximum
	Pulse Duty	10%	-	Maximum
	Pulse Amplitude Droop	0.5	dB	Maximum
	Pulse Phase Droop	40	degree	Maximum
	Pulse-to-Pulse Amplitude Stability	0.0027	dB rms	Maximum
	Pulse-to-Pulse Phase Stability	0.07	degree rms	Maximum
	Image Rejection	70	dB	Minimum
	Output Spurious Components	60	dBc	Minimum
	Output Harmonic Components	2nd: 40 Others: 60	dBc dBc	Minimum Minimum
Mechanical	RF Inputs	SMA	Female	Interface Dual SPS Racks
	RF Output	WR650 CPRF	Waveguide	Others Available
	Digital I/O	RS422	-	25-pin 38999 to Dual SPS
	AC Input	208V, 3, 60Hz	AC	50/60/400Hz and Various Voltages
	Overall 19" Rack Dimensions	24"x36"x81.24"	Inch	W x D x H
	Transmitter Weight	800	lb	Nominal
	Cooling Method	Forced Air	-	Redundancy FAUs
Environmental	Operating Ambient Temperature	0 - 40	°C	-
	Relative Humidity	65%	-	Maximum, Non-condensing
	Surge Immunity	EN61000-4-5	-	-
	Conducted RF Emissions	EN55022	-	Class B
	Radiated RF Emissions	EN55022	-	Class B
	Conducted RF Immunity	EN61000-4-6	-	-
	Radiated RF Immunity	EN61000-4-3	-	-
Safety Standards	EN60950-1	-	-	
Reliability	Built in Test (BIT)	90% Faults to LRU	-	Details in 900A0647 IDD
	Built in Protections	Over Pulse Width, Over Duty, VSWR	-	Others Defined in 900A0647 IDD
	MTBCF	80k	Hours	Minimum
	MTTR	30	Minutes	Maximum
	Transmitter Availability	99.999%	-	-
Preventive Maintenance	1	6 months	Maximum Unmanned Operational	

# DTX09501 Series Automatic Redundancy Transmitter

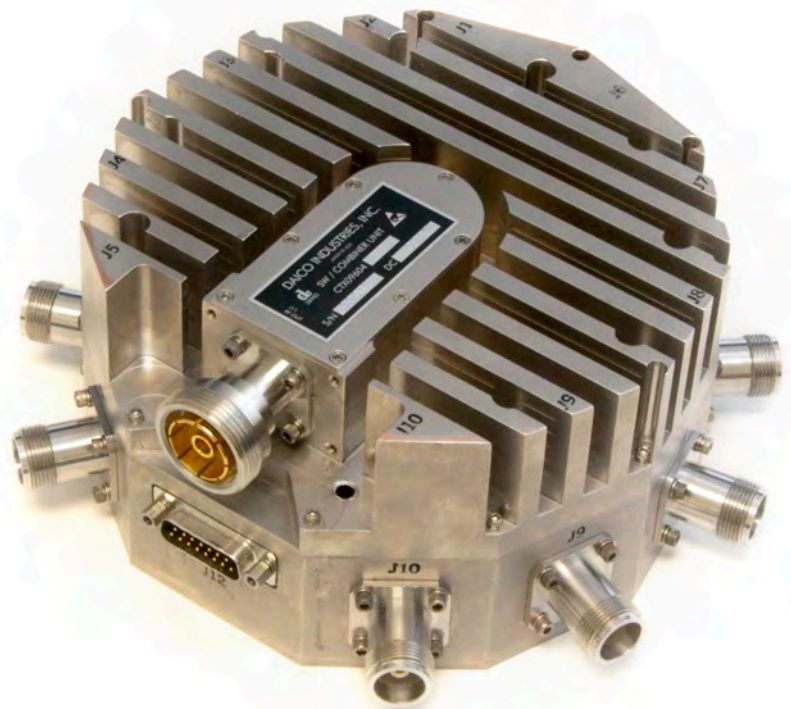
**Daico's Revolutionary (m + n)ART™- Automatic Redundancy Technology Featuring Built-In Backup Virtually Eliminates Downtime of 24/7 Surveillance Radars...**

## Additional Features

- Outstanding Pulse Quality
- Operational in > n Failed PAUs Conditions
- MTBFs for LRUs in critical path > 150K Hours
- Unprecedented
  - System MTBCF > 50K Hours under Ship Board Environment
  - System Availability > 99.999%
  - MTTR for LRUs < 30 Minutes
- Easy-to-use Mechanical Interlocking System
- Vertically Forced Air Cooling
- Built-in Protections
  - Over Pulse Width
  - Over Pulse Duty
  - High VSWR
  - Over-Temperature
  - Over Voltage
  - Over Current
- BIT and RS422 I/O Interface
  - Transmitter Status and Control
  - LRUs Status and Control
- Unmanned Operation
- Certified Agency Test
  - Surge Immunity EN61000-4-5
  - Conducted RF Emissions EN55022 Class B
  - Radiated RF Emissions EN55022 Class B
  - Conducted RF Immunity EN61000-4-6
  - Radiated RF Immunity EN61000-4-3
  - Safety Standards EN60950-1
- I/O Interface (RS422, RS232, RS485, USB IEEE-488, and Ethernet)

with no interruption in service, no reduction in performance or duplication of costs... and provides on-line availability approaching 100% from a single transmitter.

1 > 2



CTX09604 - Combiner Unit

## Electrical Connections

All electrical connections for the **DTX09501** occur in the top of the rack. Two SMA Inputs interface with SPS Rack A and B. The Output Interface is WR650 waveguide to Antenna. There are two 25-pin D-Sub I/O Connectors to communicate with the SPS Rack, A and B.

## Additional Information

For more information on this or other DAICO products, please call or contact us at [sales@daico.com](mailto:sales@daico.com)

