

SSPA Module Power Level	8-Module RF Output Power		7-Module Redundant RF Output Power	
	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)
8-Module S-Band Systems				
50 W	55.0 (316)	52.0 (158)	53.8 (240)	50.8 (120)
100 W	57.5 (562)	54.5 (282)	56.3 (427)	53.3 (214)
200 W	60.5 (1100)	57.5 (562)	59.3 (851)	56.3 (427)
300 W	62.3 (1700)	59.3 (851)	61.1 (1300)	58.1 (646)
400 W	63.5 (2240)	60.5 (1100)	62.3 (1700)	59.3 (851)
500 W	64.5 (2800)	61.5 (1400)	63.3 (2100)	60.3 (1100)
600 W	65.5 (3500)	62.5 (1800)	64.3 (2700)	61.3 (1350)
800 W	66.5 (4500)	63.5 (2240)	65.3 (3400)	62.3 (1700)
1000 W	67.5 (5600)	64.5 (2800)	66.3 (4300)	63.3 (2100)
8-Module C-Band Systems				
50 W	55.0 (316)	52.0 (159)	53.8 (240)	50.8 (120)
100 W	58.3 (676)	55.3 (335)	57.1 (507)	54.1 (254)
150 W	60.0 (1000)	57.0 (500)	58.8 (760)	55.8 (380)
200 W	61.5 (1500)	58.5 (708)	60.3 (1100)	57.3 (540)
300 W	63.0 (2000)	60.0 (1000)	61.9 (1530)	58.9 (767)
400 W	64.3 (2661)	61.3 (1334)	63.1 (2042)	60.1 (1023)
650 W	66.4 (4315)	63.4 (2163)	65.2 (3273)	62.2 (1640)
800 W	67.3 (5300)	64.3 (2661)	66.1 (4027)	63.1 (2018)
8-Module X-Band Systems				
300 W	63.0 (2000)	60.0 (1000)	61.8 (1500)	58.8 (752)
400 W	64.2 (2600)	61.2 (1300)	63.0 (2000)	60.0 (1000)
650 W	66.3 (4227)	63.3 (2118)	65.1 (3200)	62.1 (1600)
800 W	67.2 (5200)	64.2 (2606)	66.0 (4000)	63.0 (2000)
8-Module Ku-Band Systems				
50 W	55.0 (313)	52.0 (157)	53.8 (237)	50.8 (119)
80 W	57.0 (500)	54.0 (250)	55.8 (376)	52.8 (188)
100 W	58.0 (624)	55.0 (313)	56.8 (473)	53.8 (237)
150 W	59.8 (944)	56.8 (473)	58.6 (716)	55.6 (359)
200 W	61.0 (1245)	58.0 (624)	59.8 (944)	56.8 (473)
300 W	62.8 (1884)	59.8 (944)	61.6 (1429)	58.6 (716)
400 W	64.0 (2500)	61.0 (1245)	62.8 (1884)	59.8 (944)
500 W	65.0 (3100)	62.0 (1600)	63.8 (2370)	60.8 (1200)
4-Module Ka-Band Systems				
80 W	56.5 (442)	53.5 (221)	55.3 (335)	52.3 (168)
100 W	57.5 (556)	54.5 (281)	56.3 (422)	53.3 (211)
180 W	60.0 (1000)	57.0 (500)	58.8 (750)	55.8 (376)

SSPA Module Power Level	16-Module RF Output Power		15-Module Redundant RF Output Power	
	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)
16-Module S-Band Systems				
50 W	57.5 (556)	54.5 (279)	56.9 (484)	53.9 (243)
100 W	60.0 (1000)	57.0 (500)	59.4 (861)	56.4 (432)
200 W	63.0 (2000)	60.0 (1000)	62.4 (1700)	59.4 (861)
300 W	64.8 (3000)	61.8 (1500)	64.2 (2600)	61.2 (1300)
400 W	66.0 (4000)	63.0 (2000)	65.4 (3400)	62.4 (1700)
500 W	67.0 (5000)	64.0 (2500)	66.4 (4300)	63.4 (2100)
600 W	68.0 (6300)	65.0 (3100)	67.4 (5400)	64.4 (2700)
800 W	69.0 (7800)	66.0 (4000)	68.4 (6800)	65.4 (3400)
1000 W	70.0 (10000)	67.0 (5000)	69.4 (8600)	66.4 (4300)
16-Module C-Band Systems				
50 W	58.0 (630)	55.0 (316)	57.2 (525)	54.2 (263)
100 W	61.0 (1200)	58.0 (631)	60.4 (1096)	57.4 (550)
150 W	62.8 (1900)	59.8 (955)	62.2 (1700)	59.2 (832)
200 W	64.0 (2500)	61.0 (1200)	63.4 (2188)	60.4 (1096)
300 W	65.8 (3800)	62.8 (1900)	65.2 (3300)	62.2 (1660)
400 W	67.0 (5000)	64.0 (2500)	66.4 (4365)	63.4 (2188)
650 W	69.1 (8128)	66.1 (4074)	68.5 (7079)	65.5 (3548)
800 W	70.0 (10000)	67.0 (5000)	69.4 (8710)	66.4 (4365)
16-Module X-Band Systems				
300 W	65.6 (3700)	62.6 (1850)	65.0 (3220)	62.0 (1614)
400 W	66.9 (4875)	63.9 (2440)	66.3 (4246)	63.3 (2130)
650 W	69.0 (8000)	66.0 (4000)	68.4 (7000)	65.4 (3500)
800 W	70.0 (10000)	67.0 (5000)	69.3 (8500)	66.3 (4250)
16-Module Ku-Band Systems				
50 W	57.6 (575)	54.6 (288)	57.0 (500)	54.0 (251)
80 W	59.6 (912)	56.6 (457)	59.0 (794)	56.0 (400)
100 W	60.6 (1148)	57.6 (575)	60.0 (1000)	57.0 (500)
150 W	62.4 (1740)	59.4 (871)	61.8 (1514)	58.8 (759)
200 W	63.6 (2291)	60.6 (1148)	63.0 (2000)	60.0 (1000)
300 W	65.4 (3467)	62.4 (1740)	64.8 (3020)	61.8 (1514)
400 W	66.6 (4571)	63.6 (2291)	66.0 (4000)	63.0 (2000)
500 W	67.6 (5800)	64.6 (2900)	67.0 (5000)	64.0 (2500)
16-Module Ka-Band Systems				
80 W	59.1 (804)	56.1 (403)	58.5 (700)	55.5 (351)
100 W	60.1 (1000)	57.1 (507)	59.5 (881)	56.5 (442)
180 W	62.6 (1800)	59.6 (902)	62.0 (1570)	59.0 (785)

PowerMAX Systems

Patented Modular Power Combining

Pure Parallel Redundant Systems

Extremely High Linear Output Power Capability

Field Scalable

True RF Output Power Detection

Simplified "Single" Chassis Operation via Local or Remote Control

Gallium Nitride SSPA Modules



Modular amplifier systems have been in use in Satcom systems for almost 20 years. These systems offer tremendous reliability advantages over traditional SSPAs and TWTAs. The maintainability advantage of hot swap modules is critical in remote Satcom amplifier installations. **Teledyne Paradise Datacom's** premiere modular SSPA system is the **PowerMAX**. The **PowerMAX** is a patented modular microwave amplifier system that can be arranged with a variety of RF amplifier modules ranging from two to sixteen.

The **PowerMAX** architecture is based on the (n+1) redundancy philosophy where the amplifier should be sized such that one module failure can be tolerated and the system will still be able to maintain full specified output power.

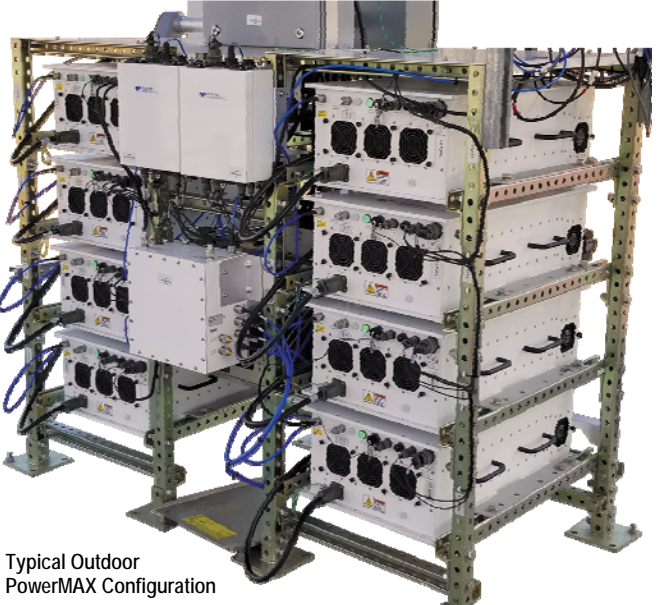
Teledyne Paradise Datacom takes the (n+1) philosophy to a new level of high reliability. Many modular amplifier systems only provide redundancy of the RF amplifier modules. The **PowerMAX** architecture provides total parallel system reliability right down to the embedded controller in each RF module. Every aspect of the system is parallel redundant including: RF amplifier modules, power supply modules, cooling fans, and monitor & control cards.

Parallel redundant systems such as **PowerMAX** are known as fault tolerant systems. This means that the overall system will not fail given an individual component or subassembly failure. In addition, all active sub-assemblies are quickly and easily field replaceable. In fact, all active subassemblies are hot-swap replaceable, meaning that the system can remain on line during repair. This leads to very low MTTR (Mean Time To Repair) numbers. High MTBF combined with low MTTR gives rise to systems that have extremely high system Availability. System Availability is a key parameter in determining the operational costs of system down time. **PowerMAX** amplifier systems are the industry's first HPA systems that have been demonstrated to achieve five (5) nines of system Availability.

Another 'industry first' that has been introduced by **Teledyne Paradise Datacom** in the **PowerMAX** system

is the use of true RF output power detection. This allows the system to measure and report the RF output power of the system with near power meter accuracy. This accuracy is maintained in the presence of multiple carriers and independent of modulation types.

The **PowerMAX** system is also extremely easy to operate. A single-point of control is maintained via the system's sophisticated embedded controller design. A master-slave hierarchy is maintained which allows the operator to interface with the multi-module system as if it were a single box amplifier. This ease of interface is realized with both local front panel control or by remote control. Remote control is facilitated by either RS485 or Ethernet.



Typical Outdoor PowerMAX Configuration

PowerMAX systems are also available in outdoor configurations. Outdoor **PowerMAX** systems are used when it is desired to position the output power of the system closer to the antenna. The Outdoor system is also popular in installations where shelter design is difficult or prohibitively expensive.

All Outdoor **PowerMAX** systems are specified to operate over -40 to +55 °C ambient temperature environments. They are configurable using both the Compact Outdoor SSPA as well as the High Power Outdoor SSPA packages.

SSPA Module Power Level	4-Module RF Output Power		3-Module Redundant RF Output Power	
	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)	P _{sat} (typical) dBm (W)	P _{linear} (min.) dBm (W)
4-Module S-Band Systems				
50 W	52.6 (180)	49.6 (90)	50.2 (104)	47.2 (52)
100 W	55.1 (320)	52.1 (160)	52.7 (184)	49.7 (92)
200 W	58.1 (638)	55.1 (320)	55.7 (367)	52.7 (184)
300 W	59.9 (970)	56.9 (484)	57.5 (560)	54.5 (280)
400 W	61.1 (1280)	58.1 (638)	58.7 (733)	55.7 (367)
500 W	62.1 (1600)	59.1 (803)	59.7 (923)	56.7 (462)
600 W	63.1 (2000)	60.1 (1000)	60.7 (1100)	57.7 (582)
800 W	64.1 (2570)	61.1 (1288)	61.7 (1500)	58.7 (733)
1000 W	65.1 (3200)	62.1 (1600)	62.7 (1800)	59.7 (923)
4-Module C-Band Systems				
50 W	52.5 (178)	49.5 (90)	50.1 (102)	47.0 (50)
100 W	55.5 (355)	52.5 (178)	53.1 (204)	50.1 (102)
150 W	57.3 (537)	54.3 (269)	54.9 (309)	51.9 (155)
200 W	58.5 (700)	55.5 (355)	56.0 (400)	53.0 (200)
300 W	60.0 (1000)	57.0 (500)	57.8 (620)	54.8 (300)
400 W	61.5 (1413)	58.5 (708)	59.1 (813)	56.1 (407)
650 W	63.6 (2290)	60.6 (1150)	61.2 (1318)	58.2 (661)
800 W	64.5 (2818)	61.5 (1413)	62.1 (1622)	59.1 (813)
4-Module X-Band Systems				
300 W	60.2 (1047)	57.2 (525)	57.8 (603)	54.8 (302)
400 W	61.4 (1393)	58.4 (700)	59.0 (802)	56.0 (400)
650 W	63.5 (2259)	60.5 (1132)	61.1 (1300)	58.1 (652)
800 W	64.4 (2780)	61.4 (1393)	62.0 (1600)	59.0 (800)
4-Module Ku-Band Systems				
50 W	52.3 (170)	49.3 (85)	50.0 (100)	47.0 (50)
80 W	54.3 (270)	51.3 (135)	51.9 (155)	48.9 (78)
100 W	55.3 (339)	52.3 (170)	52.9 (195)	50.0 (100)
150 W	57.1 (513)	54.1 (257)	54.7 (295)	51.7 (148)
200 W	58.3 (676)	55.3 (339)	56.0 (400)	53.0 (200)
300 W	60.1 (1023)	57.1 (513)	57.7 (589)	54.7 (295)
400 W	61.3 (1350)	58.3 (676)	58.9 (776)	55.9 (389)
500 W	62.3 (1700)	59.3 (850)	60.0 (1000)	57.0 (500)
4-Module Ka-Band Systems				
80 W	54.0 (245)	51.0 (125)	51.5 (140)	48.5 (70)
100 W	55.0 (306)	52.0 (153)	52.5 (176)	49.5 (90)
180 W	57.4 (543)	54.4 (275)	55.0 (313)	52.0 (160)