

# PARALLAX<sup>®</sup> SI-SSPA

## Scientific & Industrial Solid-State Power Amplifier, Liquid-Cooled

PARALLAX SI-SSPA is an efficient and rugged liquid-cooled, high-power amplifier platform suited for many scientific and industrial RF applications.

# PARALLAX

Hitachi-Comark provides high performance and award-winning television transmitters that are backed by more than 45 years of leadership in both inductive output tube (IOT) and solid-state amplifier technologies.

### Versatile RF Sources

PARALLAX is a versatile high-power RF source that can be configured for high energy physics research labs for applications that include particle accelerators, X-ray free electron lasers (X-FEL), and energy recovery linacs (ERL). It is also suited for RF component testing, RF plasma generation, or virtually any type of industrial operation requiring high-power RF sources. Adapted from our highly-successful broadcast television transmitter product line, the solid-state amplifier technology is field proven with thousands of PA modules already deployed.

### HPA Cabinet Architecture

Extremely versatile and adaptable, the SI-SSPA high-power amplifier (HPA) cabinet accommodates up to 16 final parallel amplifier modules. It also houses an internal hybrid RF PA combiner system to provide a single RF output at the top of the cabinet.

### Ultra Reliable Amplifier

RF final power amplifier modules are the heart of the SI-SSPA. High-gain PA modules are oriented vertically within the cabinet for easier handling. Each PA module weighs ~50 lbs. and is rated to deliver between 1.5 and 4.3kW CW RF output power depending on the frequency of operation. RF PA's utilize the latest generation of 50VDC LDMOS device technology for the highest reliability and efficiency.



### Power Supply Unit

Each PA module is paired (1:1) with a separate power supply unit (PSU) to minimize PA weight. The PSU uses three commercial off-the-shelf air-cooled AC to DC rectifiers. Individual PSU rectifiers can be hot-swapped, have variable fan speed control, and are adjustable over 42-58VDC outputs. The modules are 96% efficient, with a PF of >0.95 at full load. The PSU includes overvoltage, overcurrent, and short circuit protection.

## KEY FEATURES

- ▶ Supports single or multiple HPA cabinets to meet the widest range of RF power requirements
- ▶ Liquid-cooled PA's for simple installation and maintenance
- ▶ Vertical PA modules with double-sided cold plate for maximum power density
- ▶ Common system elements (cabinet, control system, user interface, etc.) for all versions of PARALLAX
- ▶ Supports individual frequency bands of 54-88MHz, 174-216MHz, or 400-700MHz
- ▶ Scalable architecture, RF output power upgrades possible
- ▶ Simple yet powerful user interface via 15" front panel high resolution color touch screen
- ▶ External passive RF systems (optional) are customized for specific building requirements
- ▶ Manufactured, serviced, and supported in the U.S.A.

### Cabinet Configurations

PARALLAX SI-SSPA HPA's are self contained in one or more equipment rack cabinets. HPA's are configured with either single or redundant IPA's, internal plumbing, as well as the RF hybrid combiners necessary for the PA's. Each cabinet is paired with a separate indoor pump module for the liquid-cooling system. System waste heat dissipation can be either with an outdoor liquid-to-air multi-fan heat exchanger or utilize a plate-to-plate exchanger for in-building / chilled water-cooling systems.

### SI-SSPA Distributed Control Logic

PARALLAX uses a distributed control system. Embedded within each

SI-SSPA cabinet is a field-proven, industrial CAN bus. Each major sub-assembly within the cabinet incorporates a dedicated micro-controller and functions as a "node". Multiple nodes are used throughout the SI-SSPA cabinet for monitoring, control, and self-protection functions. If additional SI-SSPA cabinets are used, the CAN bus is extended from the Main cabinet to the subsequent Extension HPA cabinet(s), forming a single CAN control network.

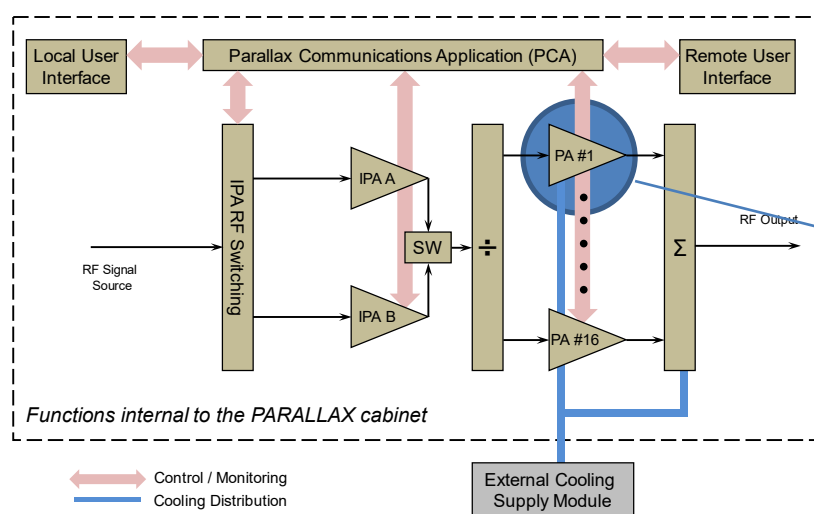
### Simple User Interface

PARALLAX provides monitoring and control both locally and remotely. Local control and monitoring is attained via the SI-SSPA's 15" color touch screen

display, which is mounted in the front door of the cabinet and employs simple and intuitive user menus. A built-in web GUI is available for remote access to the SI-SSPA via the unit's Ethernet interface, with an SNMP interface also available standard.

### Passive RF System Aids Customization

External RF systems for an SI-SSPA are customizable to meet facility design requirements. In creating the RF system, several factors are considered, including total output power, amplifier configuration, RF signal specifications (such as harmonic levels and spectral mask), specific building layout, and installation plan.



Front View of Modules

## GENERAL SPECIFICATIONS

### Modulation Standard:

- CW, pulse, AM, FM, digital
- 0dBm nominal input level

### Operating Frequency:

- 54-88MHz, 176-216MHz, or 400-700MHz
- Other bands upon request

### RF Output Power:

- Frequency dependent
- Up to 66 kW CW with a single SSPA cabinet (16 PA modules)
- Multiple parallel HPA cabinets for up to 500kW

### Electrical:

- AC Mains 3-phase, 4 wire (WYE) plus ground
- 208\* VAC -11% / +15%
- 380-415\* VAC +/-15%
- 480 VAC -15% / +8%
- 50/60 Hz
- > 0.98 power factor

### Monitor & Control:

- Local 15" color touch screen
- Web: Ethernet via RJ-45
- Dry loop/TTL via DB-37
- SNMP v2 via Ethernet

### Environmental & Safety:

- -0° to 45° C temperature range
- ≤ 90% non-condensing relative humidity
- Liquid-cooled PA modules
- Indoor dual pump / sump assembly
- Outdoor dual fan heat exchanger or plate-to-plate exchanger
- ≤ 3000 M Maximum Altitude

### Mechanical:

- 80" H x 30" W x 56" D per HPA Equipment Rack Cabinet
- 80" D for 54-88MHz Cabinet

\* 208 & 380-415VAC is power limited, consult factory for details

## ORDERING INFORMATION

Please contact your authorized Hitachi-Comark representative.  
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