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POS (Point of Sale) Load Analysis – Electrical Design Criteria:
(Restaurant Applications - Quick Serve & Full Serve)

The purpose of this POS Load Analysis is to establish Electrical Design criteria for the application of the following centralized UPS electrical distribution systems:

- Mac Victor Power Network 1.5 (Mac Victor 1.5) – 1.5kVA capacity @ 120Vac
- Mac Victor Power Network 2.0 (Mac Victor 2.0) – 2.0 or 3.0kVA capacity @ 120Vac

The Mac Victor 1.5 is a single branch circuit product and the Mac Victor 2.0 has four (4) individual branch circuit breakers with an optional 5th branch circuit breaker for IG (Isolated Ground) receptacles that are integrated into the product on the left hand side of cabinet.

SCOPE OF WORK:

Conduct amp load readings for all the primary system components and peripherals that comprise a typical POS Network in Restaurant (Quick Serve & Full Serve) applications:

- Back Office Servers and Monitors
- POS terminals, receipt printers
- Stand alone monitors (back line and kitchen)
- Peripherals (router, modem)
- POS system components tested included manufacturers: Radiant, IBM, Dell, Epson, Acer, Cisco, and Terayon.

TEST RESULT SUMMARY:

The POS system amp load analyses are attached on pages 3 - 7. The oscilloscope used to collect this data was a FLUKE 196C Color Scopemeter with screen image storage capability.

The POS system analysis yielded the following MAXIMUM amp load design criteria results:

- POS Terminal – 0.70 amps
- Receipt printers – 0.35 amps
- Kitchen monitor (CRT) – 0.63 amps
- Back Office Server – 1.30 amps
- Back Office LCD Monitor – 0.58 amps
- Router – 0.11 amps
- Modem – 0.12 amps

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Assumptions:

- Trend log amp load tests were run with both the POS terminals and Office Server due to startup and intermittent amp loads which exceed the continuous amp loads. These maximum intermittent amp loads were used for the design amp load criteria.
- Receipt printers were tested in the printing mode to capture the maximum amp load.
- Monitors, Routers, and Modems did not have any startup inrush or intermittent load.

Application Overview:

- It is of critical importance to provide clean, isolated power to the entire POS system including all peripheral devices to assure optimum performance and system protection. A typical IG receptacle provides a separate ground conductor but does not provide true "isolation" from the electrical noise (especially between Neutral and Ground conductors) generated by the loads within the facility. This is only provided by low impedance transformer-based Power Conditioners.
- The electrical design having all the IG receptacles for the POS related equipment on the same 120Vac electrical phase of power is very good for several reasons. It can prevent the formation of "ground loops" since there are no potential voltage differences among all the outlets. It also allows for the installation of a centralized 120Vac battery backup for the entire POS system and related components.
- The Mac Victor 1.5 and the Mac Victor 2.0 both provide a centralized battery backup system with a low impedance Power Conditioner feeding power to all the remotely located IG receptacles for the POS network and other critical electronics. The Mac Victor 1.5 utilizes a POWERVAR UPM with the Power Conditioner built into the UPM along with the batteries. The Mac Victor 2.0 has the Power Conditioner built into the base unit and is separate from the battery backup UPS.
- The Mac Victor 1.5 and Mac Victor 2.0 both provide the interfacing between the plug and receptacle UPS and the hard wiring the input circuit breaker and the branch circuit IG receptacles. It also provides for a means to bypass the UPS and restore power to the connected loads in the event of UPS system maintenance or UPS system failure
- UPS Maximum Load capacity: Mac Victor 1.5 = 12 amps

  Mac Victor 2.0 = 16 amps (2.0kVA) / 24 amps (3.0kVA)
- UPS Design Load capacity: Mac Victor 1.5 = 9.6 amps (20% derated)

  (both 20% derated) Mac Victor 2.0 = 12.8 amps (2.0kVA) / 19.2 amps (3.0kVA)
- The best practice Electrical design criterion is to add together the maximum amp loads of all system devices including any desired future expansion amp load. This total system and expansion amp load should not exceed the derated UPS Design Load capacity of the selected Mac Victor 1.5 or Mac Victor 2.0 system.

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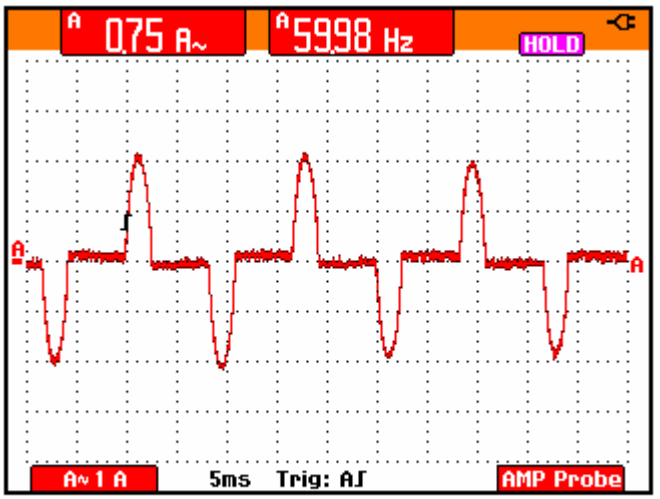
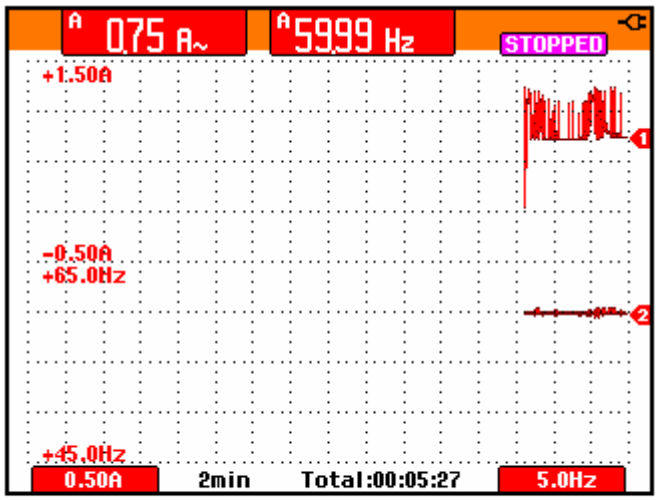
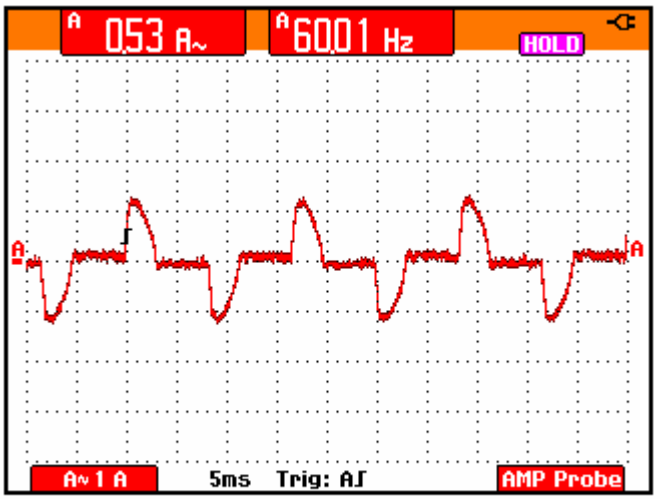
Back office computer / monitor amp load profiles:



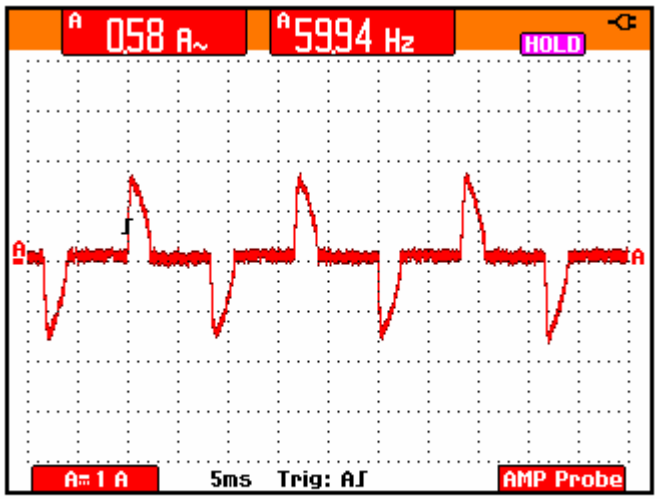
Dell PC Tower Server Model 8300
Continuous amp load profile



Dell PC Tower Server Model 8300
Amp load trend log during startup
Peak intermittent amp load = 1.3 amp



Dell 18" LCD monitor Model 1800FP
Continuous amp load profile



IBM 17" CRT monitor
ampere load profile

Maximum Load Profile

- Back Office Server – 1.30 amps
- LCD Monitor – 0.58 amps

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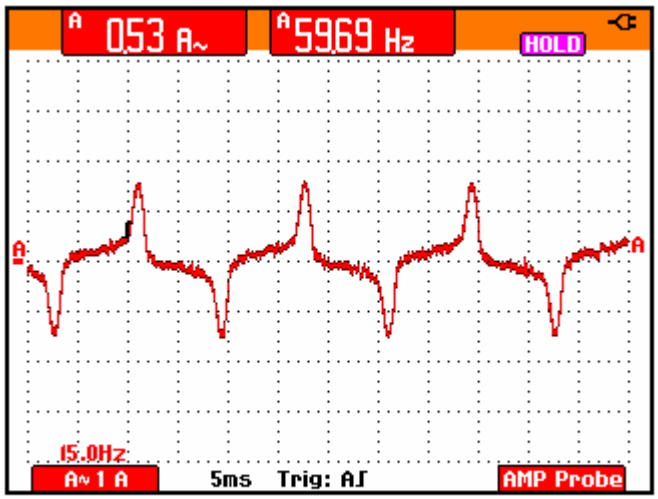
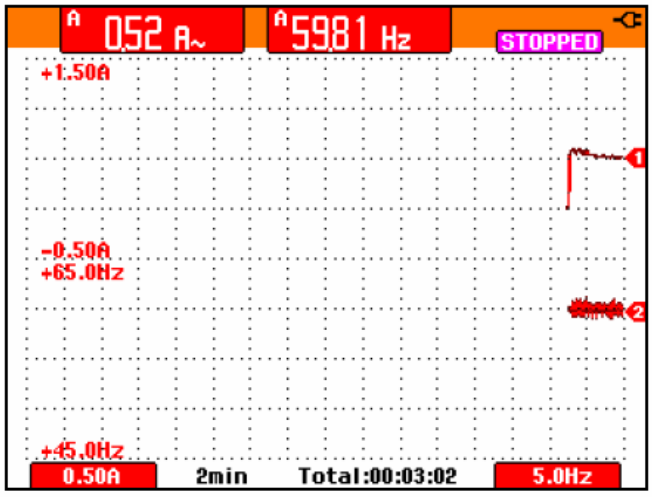
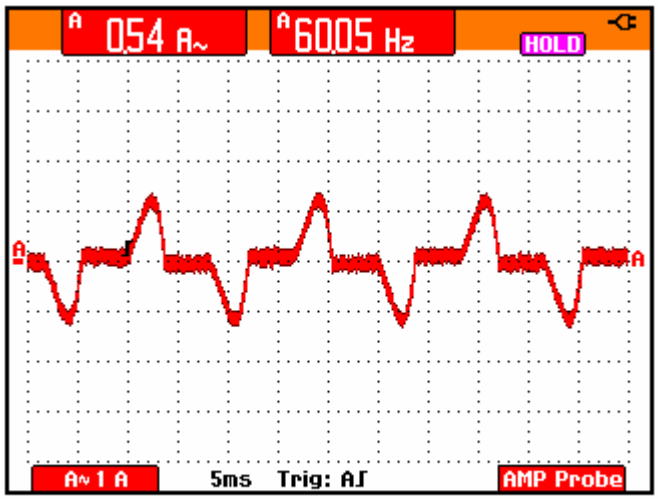
POS terminal amp load profiles and trend logs:



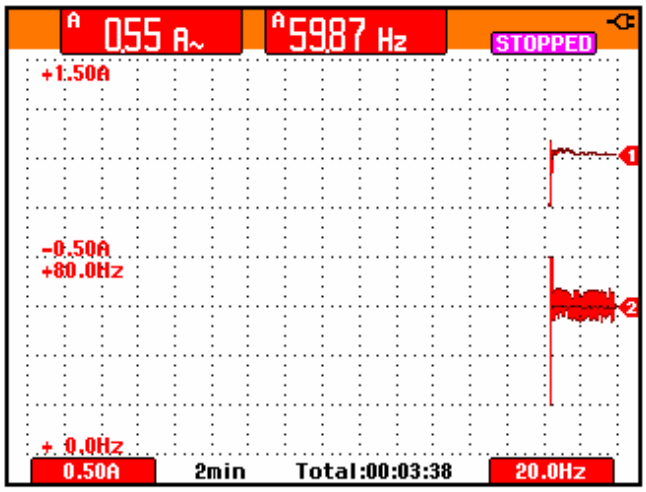
Radiant POS terminal Model 5115
Continuous amp load profile



Radiant POS terminal Model 5115
Amp load trend log during startup
Peak intermittent amp load = 0.6 amp



IBM POS terminal Model Sure POS 500
Continuous Amp Load profile



IBM POS terminal Model Sure POS 500
Amp load trend log during startup
Peak intermittent amp load = 0.7 amp

Maximum Load Profile

- POS Terminal – 0.7 amps

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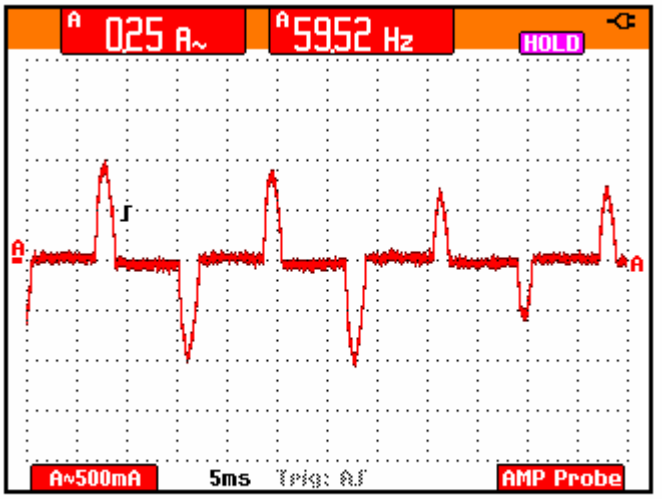
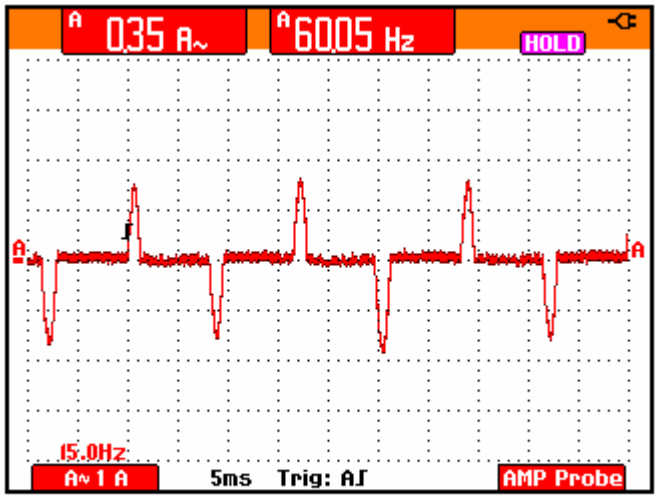
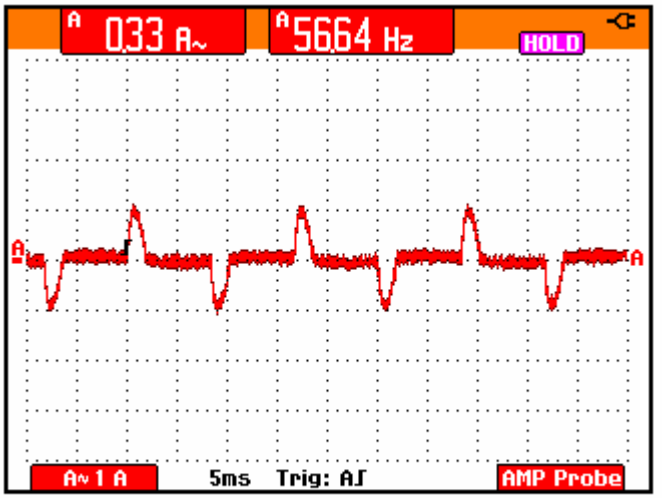
Receipt printer load (amp) profiles:



Epson receipt printer T-88
Max amp load profile (during print)



Epson receipt printer Model U220B
max amp load profile (during print)



IBM receipt printer Model 4610
Max amp load profile (during print)

Maximum Load Profile

- Receipt printer – 0.35 amps

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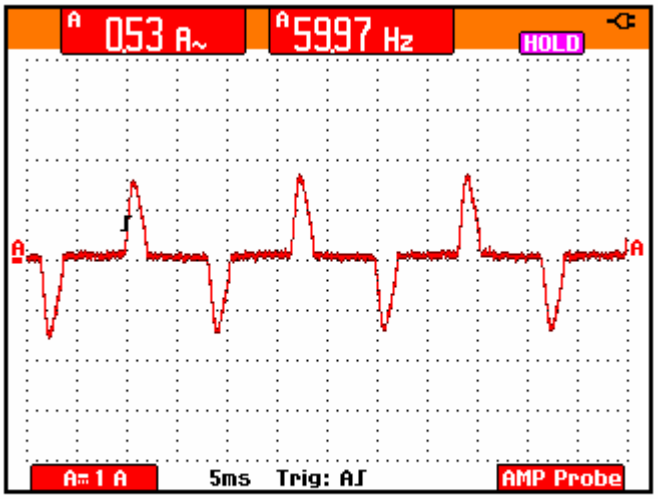
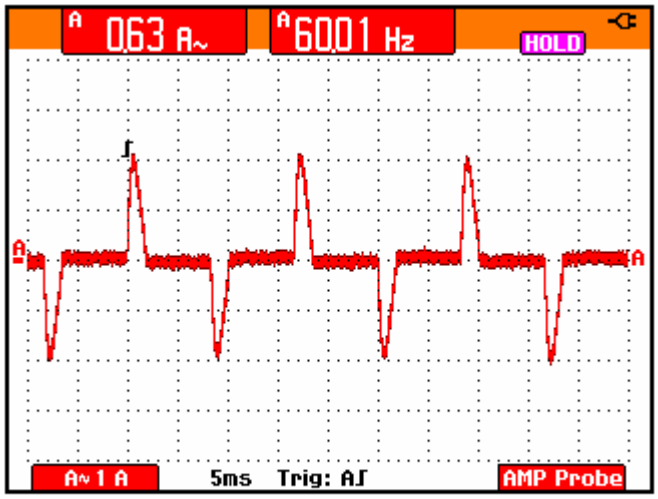
CRT Monitor (back line & kitchen) load (amp) profiles:



Acer 15" CRT kitchen monitor V551
continuous amp load profile



IBM 17" CRT kitch monitor Model E74
Continuous amp load profile

Maximum Load Profile

- Kitchen Monitor (CRT) – 0.63 amps

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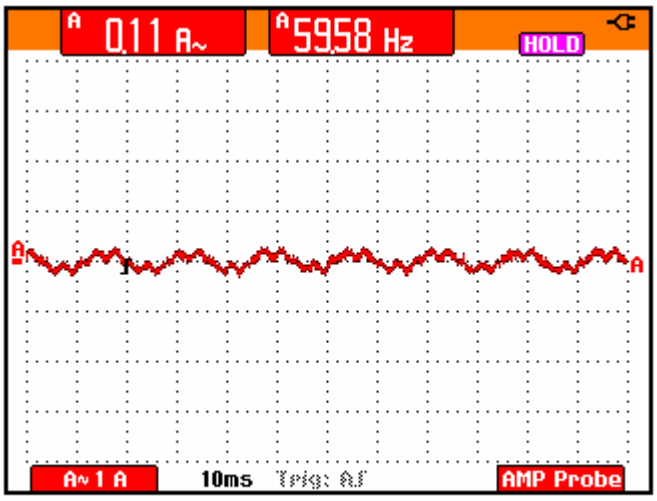
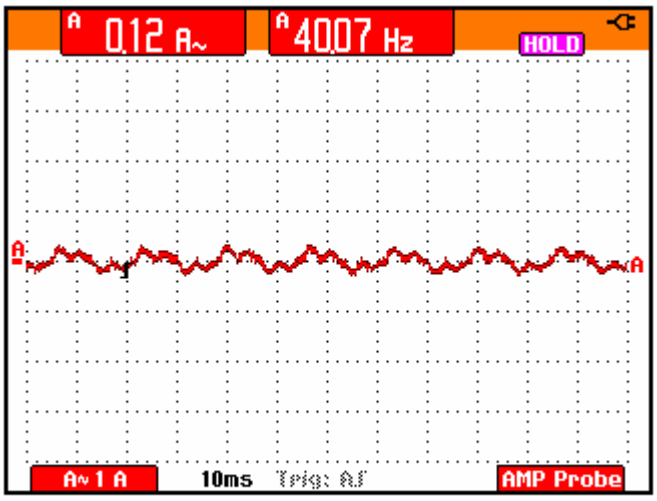
Network switch, router, modem load (amp) profiles:



Cisco Router model Linksys WRT64GS
Continuous amp load profile



Terayon internet modem model TJ210
Continuous amp load profile

Maximum Load Profile

- Router – 0.11 amps
- Modem – 0.12 amps

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