

ACE3600 is a state-of-the-art high performance Remote Terminal Unit (RTU) with exceptional communication capability. The unit is designed to provide scalability and modularity to optimize the performance of any control system. The unit's rugged design offers compliance for the requirements of most demanding SCADA system environments. Motorola has developed this innovative RTU to provide a cost effective RTU solution by minimizing the installation and configuration time.

Main Features:

- Power PC based processor provides very high performance
- VX-Works based real-time operating system
- Up to three Ethernet ports
- Up to four serial communication ports
- Up to two radio modem ports
- Up to 2 USB ports
- 0,2,3,5,7 or 8 I/O slot wall mount & 19" frames
- Expansion frames allow up to 110 I/O modules in a single RTU.
- Redundant CPU and power supply
- Single and double density I/O modules
- Mixed analog input and output modules
- Hot Swap I/O replacement
- Wide operating temperature range -40 to +70 °C
- NEMA 4 / IP66 Housing, 40 x 40 cm and 50 x 50 cm
- Two-way/trunking/ digital radio models
- AC and DC controlled power supply
- 6.5 or 10 Ah Backup battery, smart battery charger
- GPS and NTP for time synchronization
- System building tool for configuration and programming
- Remote firmware and program download
- Compatible with MOSCAD family of RTUs
- Multiple Protocol Support: Modbus, DNP 3.0, DF1, IEC 60870-5-101



ACE3600

Advanced Control Equipment

The ACE3600 is a powerful Remote Terminal Unit (RTU) in Motorola's family of Supervisory Control And Data Acquisition (SCADA) products.

ACE3600 provides an advanced data collection and processing unit with the intelligence required to operate in sophisticated SCADA systems.

Advanced communication and networking capabilities include data transfer via two-way radio, trunked radio, digital radio, data radio, cellular modems, IP networks, line modem and more.

LOCAL INTELLIGENCE

ACE3600 is a microprocessor-based RTU with large memory capacity that can make control decisions on-site, based on status conditions and values from local and remote sources.

Local intelligence permits control decisions without the need for real-time messages from other supervisory centers; ACE3600 can operate in sophisticated control systems.

PROGRAMMABLE

ACE3600 uses an advanced symbolic ladder logic application language to develop the data base conditions, values, and RTU profile that must exist for each control action, message transmission, etc. to occur. Routines written in 'C' may be executed as a whole or part of the total application.

Powerful applications may easily be defined using industry accepted ladder logic and 'C'. The task is made easier by using the SCADA application development software and a PC-style computer.

PROTOCOLS

ACE3600 uses the OSI-based MDLC communication protocol for all data signaling. Third party MODBUS, DNP 3.0 DF1 (Allen Bradley) and IEC 60870-5 protocols are also supported.

MDLC was specifically developed for radio use but is completely applicable to Ethernet, wireline, and other media. It permits large volumes of data to be quickly transferred between units using packet transmission techniques.

The MDLC protocol enables adding the ACE3600 easily to existing MOSCAD systems where system expansion is required.

COMMUNICATIONS

ACE3600 permits communication to occur RTU-to-central and RTU-to-RTU (peer-to-peer). Communication may occur between individual units or may be broadcast to several units simultaneously.

Store-&-forward may be employed to pass messages RTU-to-RTU throughout the system. Direct communication, where possible, or repeated messaging over one or multiple communication media, may be intermixed within the system.

UPLOAD/DOWNLOAD

ACE3600, via the MDLC data transfer capability, uploads the data collected and calculated by the application program to a central site. It also receives downloaded changes to the application program

and/or to the parameters that control how the application operates.

The process being supervised does not need to be static; operational variables and limits, and the process definition itself, can be easily changed and transmitted to the RTU from anywhere in the system's network.

A unique feature of ACE3600, also enables remote firmware safe download from anywhere in the system's network. This allows remote firmware upgrades.

The above features minimize site visits by maintenance personnel after the unit's initial installation.

COMMUNICATION PORTS

Connectors on the various CPU modules permit the connection for local application programming, or connection to other on-site devices to supervise their operation, and to the communication media device.

Multiple connectors, multiple communication types, and variable data speeds allow practically all external data devices to be connected to the CPU module.

CHASSIS AND ENCLOSURES

ACE3600 can be provided on a metal chassis or in a painted steel NEMA 4 (IP66) rated outdoor enclosure that can hold the RTU frame, modules, battery and up to two radios (depending on enclosure size). An optional tamper switch can be ordered with the enclosure.

19" RACK MOUNT

ACE3600 may be ordered with frame and mounting accessories that permit direct mounting onto standard 19" equipment racks. The frame contains space for power supply, CPU module and up to eight I/O modules. Optionally, a 19" metal back can be ordered for installation of backup battery, accessories and up to two radios.



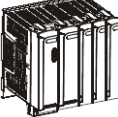

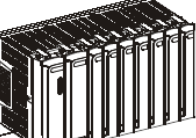
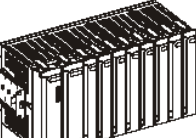

I/O EXPANSION

The ACE3600 RTU can be expanded to include up to 110 I/O modules controlled from the CPU. The I/O expansion is based on Ethernet LAN connection between the CPU module and the I/O expansion frames. The I/O expansion frames can be co-located with RTU on the main frame (installed in the same 19" rack or cabinet) or distributed in the same site up to 50 meters from the main frame location.

CPU AND POWER SUPPLY REDUNDANCY

The redundant configuration enables installation of two redundant CPUs (CPU3680 only) and two redundant power supply modules to ensure continuous RTU operation and voltage.

ACE3600 GENERAL SPECIFICATIONS

Frames	No I/O slots - PS and CPU modules only, wall mount 117 W x 209 H x 198* D mm (4.61" x 5.30" x 7.80**), 0.95 Kg (2.1 Lb)	
	2 I/O slots - PS, CPU and 2 I/O modules, wall mount, 194 W x 244 H x 198* D mm (7.64" x 9.61" x 7.80**), Approx. 1.6 Kg (3.56 lb)	
	3 I/O slots - PS, CPU and up to 3 I/O modules, wall mount 234 W x 244 H x 198* D mm (9.21" x 9.61" x 7.80" *), Approx. 1.9 Kg (4.19 Lb)	
	5 I/O slots - PS, CPU and up to 5 I/O modules, wall mount 314 W x 244 H x 198* D mm (12.36"x 9.61" x 7.80" *), Approx. 2.4 Kg (5.3 Lb)	
	7 I/O slots - PS, CPU and up to 7 I/O modules 391 W x 244 H x 198* D mm (15.39" x 9.61" x 7.80" *), 3. Kg (6.6 Lb)	
	8 I/O slots - PS, CPU and up to 8 I/O modules, wall mount OR 19" rack 435 W x 244 H x 198* D mm (17" x 9.61" x 7.80" *), Approx. 3.3 Kg (7.3 Lb)	
	Redundant CPU and power supply frame - Dual PS, Dual CPU, and 4 I/O modules; wall mount OR 19" rack, 391 W x 244 H x 198* D mm (15.39" x 9.61" x 7.80" *), 3. Kg (6.6 Lb)	
* Depth including module panel Note: All frames except No I/O Slots can be used for I/O expansion.		
I/O Expansion Frame	Number of I/O slots - 2, 3, 5, 7, or 8 Default power supply - Expansion power supply Compatible power supplies - All except: 10.8-16V DC low-tier power supply	
Metal Chassis	19" frame metal back - for PS, ACE IP Gateway, radio and 6.5 or 10 Ah backup battery, 2 accessory boxes; wall/rack mount, OR PS, CPU, radio and 6.5 or 10 Ah backup battery, 0, 3, 5, or 8 I/O slot frame, up to 2 accessory boxes, wall/rack mount, 434.5 W x 310.4 H x 200* D mm (17.11"x 12.22" x 7.88"*) Large - for PS, CPU and up to 7 I/O slot frame, two radios and 6.5 or 10 Ah backup battery, wall mount, 448 x 468 mm x 200* D mm (17.64" x 18.43" x 7.88"*) Medium - for PS, CPU and up to 3 I/O slot frame, one radio and 6.5 Ah backup battery, wall mount, 335 W x 355 H x 198* D mm (17.64" x 18.43" x 7.80"*) Small - for PS, CPU, 2 I/O slot frame, 1 radio (or 1 accessory box), and 6.5Ah backup battery, wall mount, 264 W x 365 H x 200* D mm (11.02"x 14.17" x 7.88"*) * Depth Including Frame and Module	
Housing	Large NEMA 4/IP66 painted metal - up to 7 I/O slot frame, two radios and 6.5 or 10 Ah, backup battery, 500 W x 500 H x 210 D mm (19.7" x 19.7" x 8.26") Small NEMA 4/IP66 painted metal - up to 3 I/O slot frame one radio and 6.5 Ah backup battery, 380 W x 380 H x 210 D mm (15" x 15" x 8.26")	

Power Supply	10.8-16 V DC 10.8-16 V DC low-tier 18-72 V DC 18-72 V DC with 12 V smart battery charger 100- 240 V AC, 50-60 Hz 100- 240 V AC, 50-60 Hz, with 12 V smart battery charger
Backup Battery	6.5 Ah - Sealed Lead-Acid 10 Ah - Sealed Lead-Acid
Operating Temperature	-40 °C to +70 °C (-40 °F to 158 °F) Notes: (1) when using a metal housing option, the maximum operating temp. outside the housing is +60 °C (140 °F). (2) Motorola radios and ACT module operating temp. range is: -30 °C to +60 °C (-22 °F to 140 °F) The full operating temperature range is supported when using redundant 12V power supplies. When using dual AC power supply or dual 18-72 V DC power supply, the maximum ambient operating temperature of the RTU is limited to: <ul style="list-style-type: none"> • 50°C (122°F) - when installed inside a metal chassis or closed cabinet. • 60°C (140°F) - when installed without enclosure or closed cabinet.
Storage Temperature	-55 °C to +85 °C (-67 °F to 185 °F)
Operating Humidity	5% to 95% RH @ 50 °C without condensation
Mechanical Vibrations	Per EIA/TIA 603 Base station, Sinusoidal 0.07mm @ 10 to 30 Hz, 0.035 mm @ 30-60 Hz
Operating Altitude	-400m to +4000 meter (-1312 ft to + 13120 ft) above sea level Note:100-240 V AC and 18-72 V DC PS operating altitude is -400m to +3000 meter (-1312 ft to + 6560 ft)