Motorola ACE1000

Introduction

ACE1000 RTU - BUILDING BLOCKS

Power Supply

I/O Modules

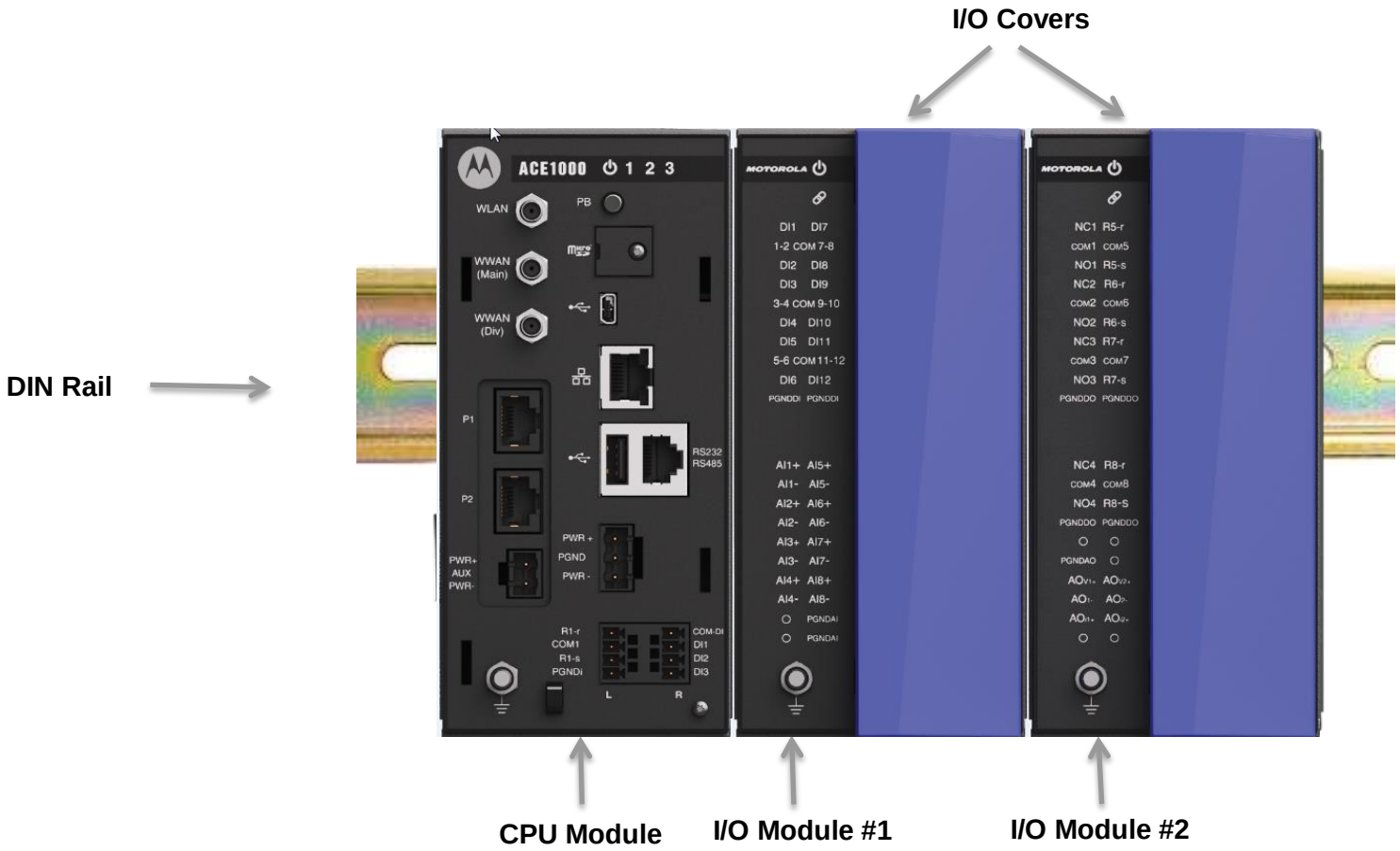
ACE1000 Front End Processor (FEP)

STS Suite and Application Development Tools

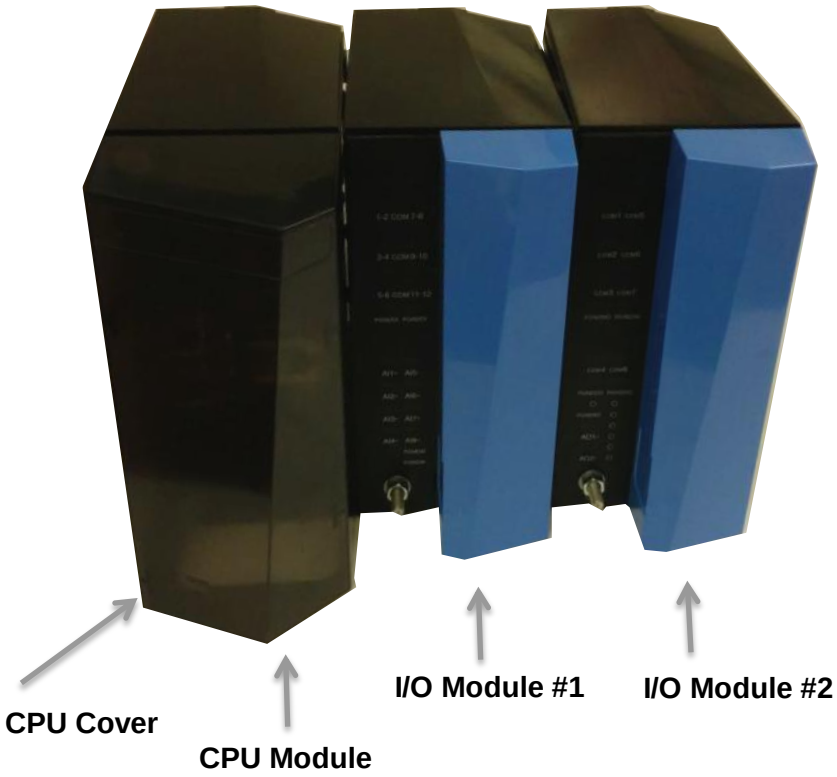
WEB-Based Configuration tool

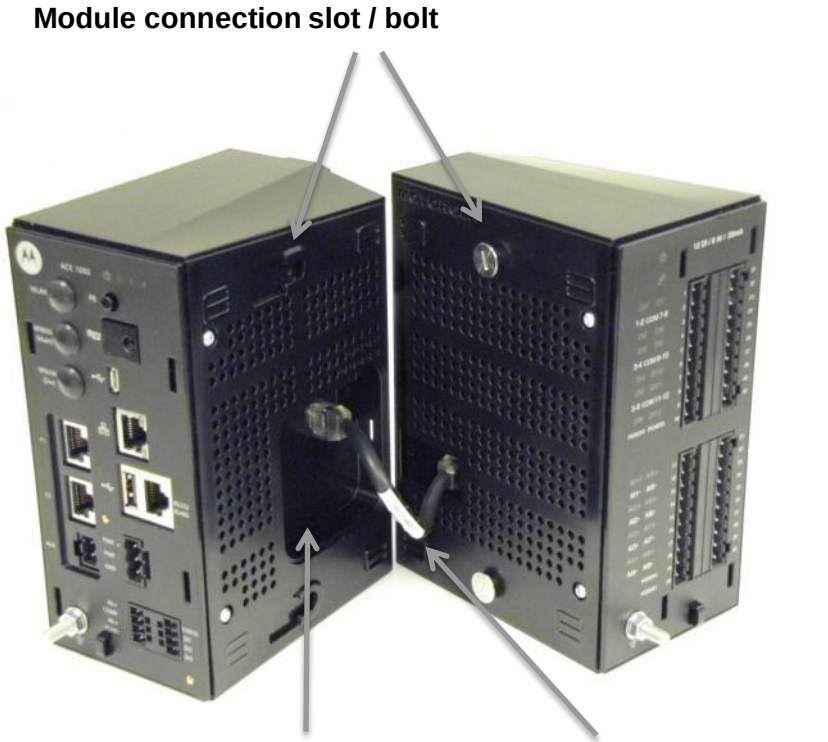
Radios/Modems

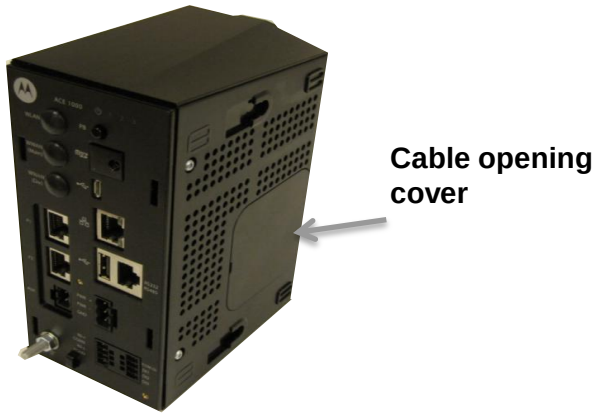
ACE1000 – CONSTRUCTION



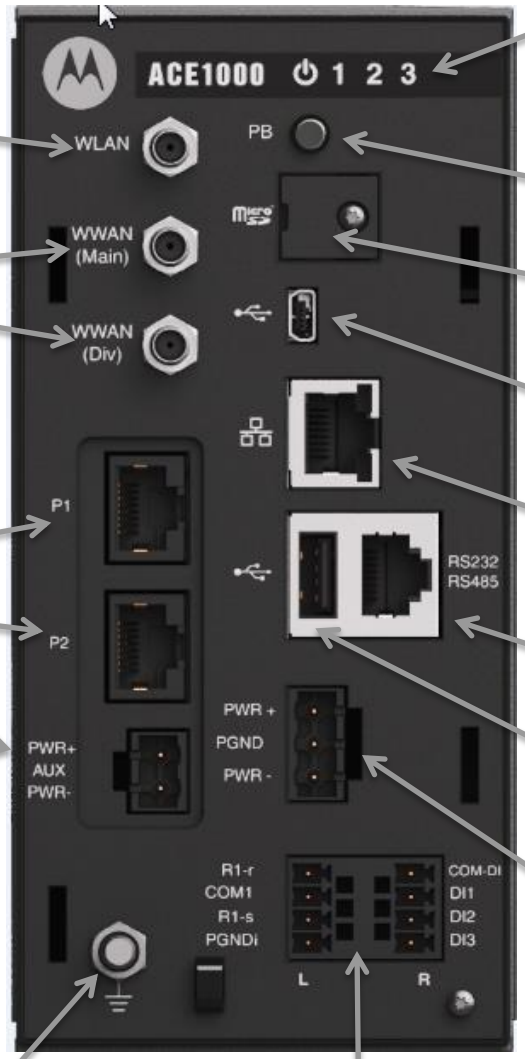
ACE1000 – CONSTRUCTION







CPU MODULE



Power/Error and Local I/O Indication LEDs
Local LED indication can be toggled between DI state and DO state (using “Pushbutton”)

WLAN Reverse Polarity SMA Connector
Optional (Future):
WLAN module

Pushbutton

4G MIMO SMA Connectors
Optional (Future)
Cellular modem

Micro SD Card
For local logging, user usage

USB OTG Port
As Console port:
HTTPS, SSH
and as USB HOST
for external devices

Plug-In Board
2x RS232 (isolated) +

AUX out (configurable: 5v,7.5v,9.5v,12v,Input)

Future: Analog radio UART, Ethernet , USB, CAN

Ethernet 10/100 Mb/sec

RS232/485 Port
For Cellular modem, TETRA, Data radio

USB HOST Port
For ASTRO, MotoTRBO, other USB supported devices

Input Power
9-30 VDC

CPU I/Os
3 X DI
1 X DO

Grounding Screw

Preliminary

CPU SPECS (1)

CPU

- SITARA Cortex A8 (working at 275 MHz)

OS

- Linux Embedded

Memory

- FLASH: 256 MB (At least 32 MB for user usage)
- RAM: 256 MB (Low Power DDR)
- SD Card (up to 32 GB) support for logging and user data

RTC

- Maximum daily drift 20 PPM
- Leap year support
- RTC Backup Battery – Backup for at least 20 days @ 25ºC
- Date and Time – Set via Web interface or STS
- Date and time can be synced via NTP, MDLC, GPS Receiver interface

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CPU SPECS (2)

Power

- Input voltage range: 9-30 VDC
- AUX output voltage: on plug-in (optional)
- Typical consumption: ~9W (Including Two I/Os expansions)
- Runtime consumption: 65mA @ 12V DC (1 x RS485,1 x RS-232, No I/Os)
- Sleep mode consumption : ~5.5mA @12v

CPU I/Os

- 3 x Digital Inputs (DI):
  - Wet inputs (Externally powered: 0-3v='0', 6v- input voltage='1')
  - De-bouncing filter: 10,20,30,40,50 msec
  - Fast counter: 2KHz
  - Isolation: 1500 V
- 1 X Digital Output (DO):
  - Magnetically Latched Form C (SPDT)
  - Hardware back indication
  - Support up to 1A
  - Isolation: 1500 V

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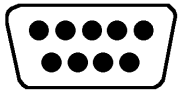
COMMUNICATIONS SPEC

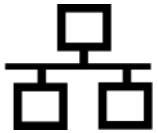
Serial Ports

- Main board: RS232 (115.2kbps)/RS485 (460 kbps), Half/Full Duplex with/without CD
- Plug In (Optional): Isolated 2 X RS232 (115.2 kbps)



Ethernet Port

- On board: 10/100Mbps



USB Ports

- Host port
- On The Go (OTG)

Plug-in Ports Roadmap:

- Analog radio modem
- Ethernet
- WiFi
- WAN (cellular)
- CAN

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PROTOCOL SUPPORT

MDLC:

- Session
- Mini Session
- Frame Sequence
- Date and time, file transfer
- MDLC over IP (Over Ethernet/PPP (serial)/RNDIS (USB))
- MDLC over Serial (including multi-drop)
- Table structures:
  - Same as MOSCAD-M

3RD Party SCADA Protocols:

- Modbus (Slave/Master over RS232/RS485 and Ethernet)

Roadmap Protocols:

- DNP 3.0 v4

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Supported Radio / MODEMS

Motorola Radio Support :

- MotoTRBO
- ASTRO (P.25)
- TETRA
- ASTRO (Analog) – Roadmap feature

3rd Party Modem Support:

- Cellular Modem
- Leased Line Modem
- Data Radio
- Broadband Radio

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MOTOROLA RADIO(s) COMPATIBILITY CHART

Technology	Infrastructure type	Tested Subscriber	Interface type
ASTRO IV&D (P.25)	• Digital Conventional/DMO • Digital Trunking	APX 4500 (7/8/900)	USB (RNDIS)
		APX 4000 (7/8/900)	USB (RNDIS)
MotoTRBO	• Radio to Radio (No Backbone connectivity)	XPR 5350 DM 4400 XIR 8660 DGM 6100	USB (RNDIS)
Dimetra IP (TETRA)	• Digital Trunked	MTM5200	RS232 (PPP)

Preliminary

12 DI/8AI MODULE

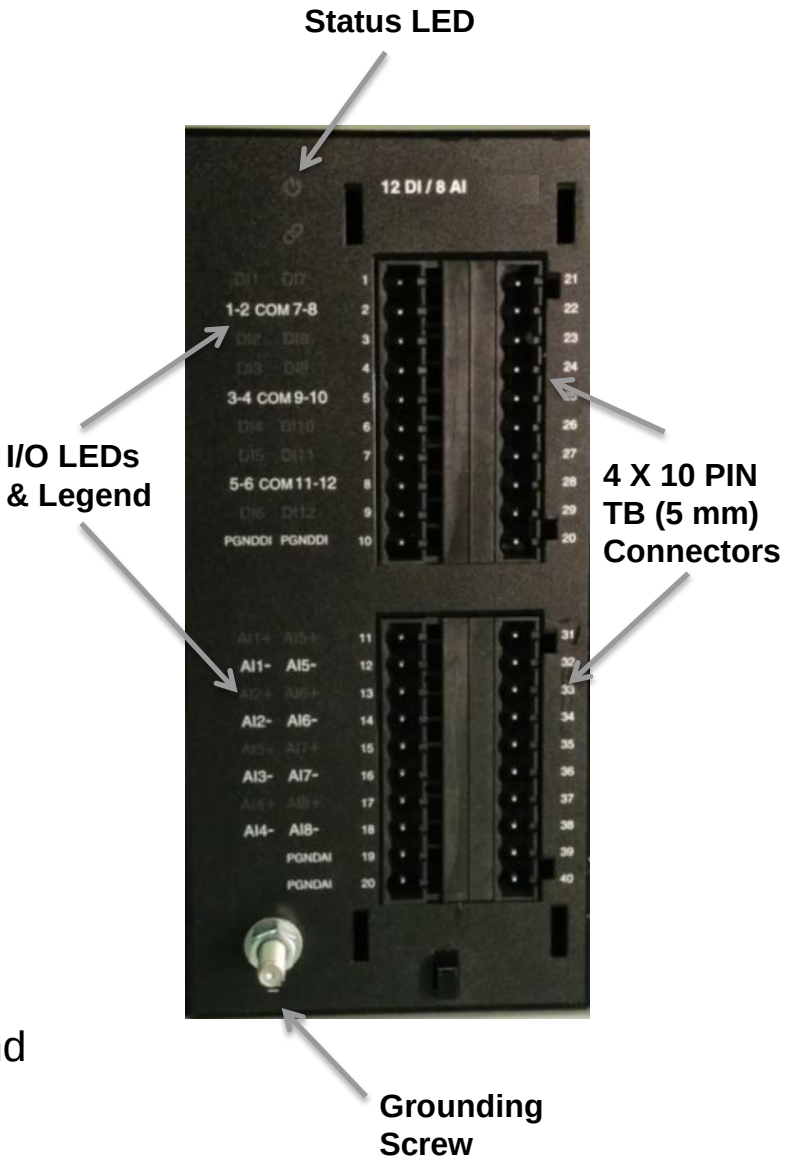
- 12 x Wet DI isolated
- 8 x AI isolated

Digital Inputs (DI):

- Wet inputs (Externally powered: 0-3v=‘0’, 6- input voltage=‘1’)
- De-bouncing filter: 10, 20, 30, 40, 50 msec
- Fast counter: 2KHz
- Isolation to CPU: 1500 V

Analog Inputs (AI):

- 0-20mA, 4-20mA or 0-5VDC
- Resolution: 16 bit
- Accuracy: ± 0.1% of full scale
- User configurable smoothing
- User Configurable scaling
- Sampling rate – at least 10 samples per second



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8DO / 2AO MODULE

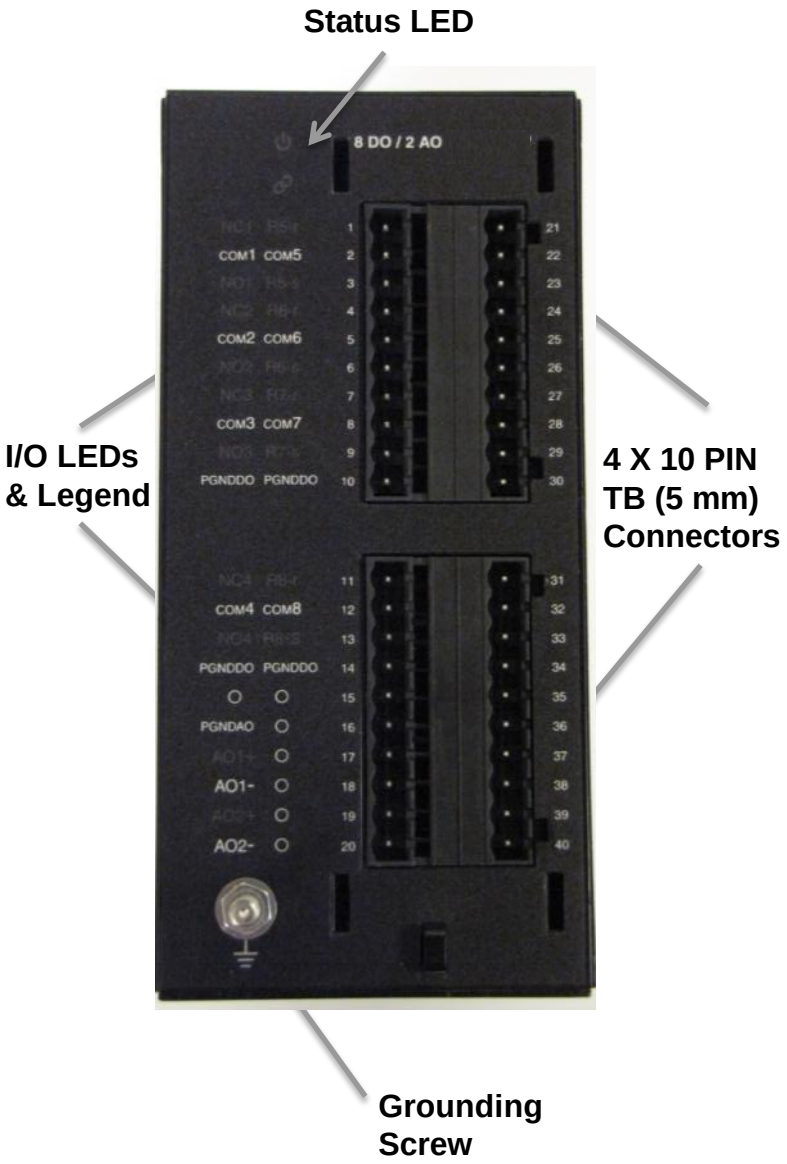
- 8 x DO Relay
- 2 x AO

Digital Outputs:

- 4 X ML Form C (SPDT)
- 4 X EE Form C (SPDT)
- DO frequency :10 Hz

Analog Outputs:

- 0-20mA or 0-10VDC (configurable)
- Resolution: 12 bit
- Isolation to CPU: 1500 V



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OPERATING CONDITIONS

Operating Temperature:

- - 40 to +70ºC (excluding radios)

Storage Temperature:

- -55 to + 85ºC (excluding radios)

Operating Humidity:

- 5% to 95% RH @ 50ºC

Mechanical Vibrations:

- EIA/TIA 603 Base station, Sinusoidal 0.07mm @ 10-30 Hz, 0.035 mm @ 30-60 Hz

Operating Altitude:

- -400m to +4000 meter

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REGULATORY

Safety Conformance:

- UL 60950-1
- CSA 22.2-60950-1
- IEC 60950-1/EN60950
- AS/NZS 60950

Emission:

- FCC part 15 , subpart B, Class A
- CE,EMC EN/IEC55022 Class A
- CISPER 22

Immunity- IEC 61000-6-1

- EN/IEC55024

Hazardous Area Conformance:

- IECEx/ ATEX - EXnA IIC T4 (Cat 3/Zone 2)

  * w/o radio, in ATEX approved enclosure

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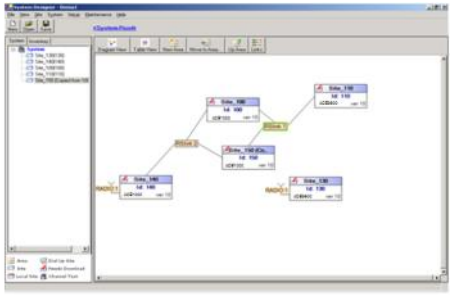
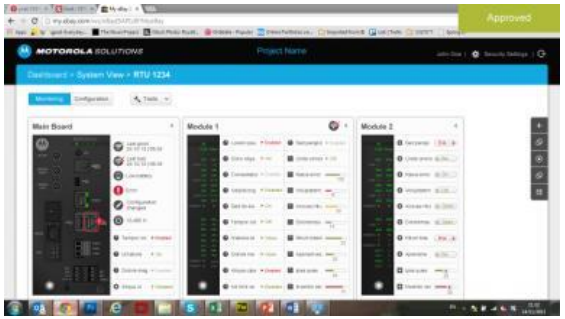
CONFIGURATION AND PROGRAMMING



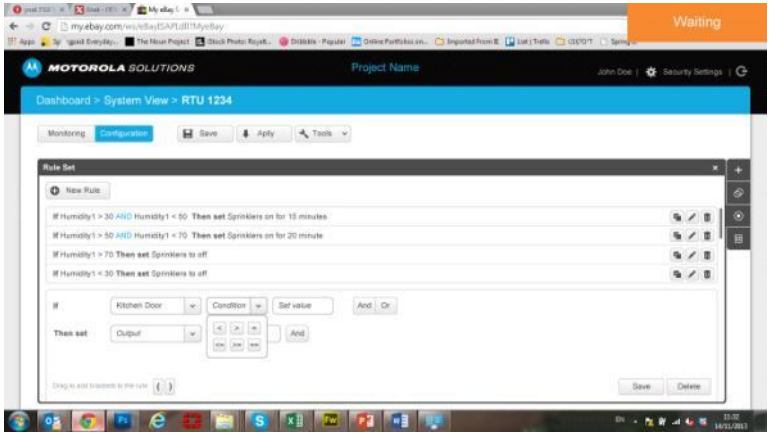
Configuration:

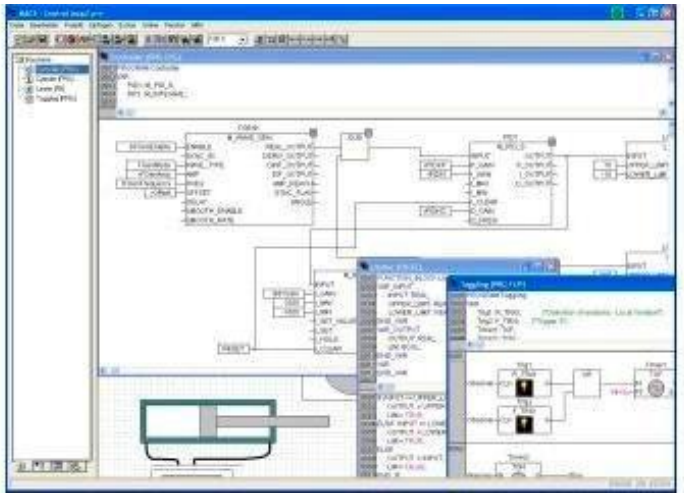
- Web Browser (New System's with FEP)
- STS (Mixed system)



Programming Tools:

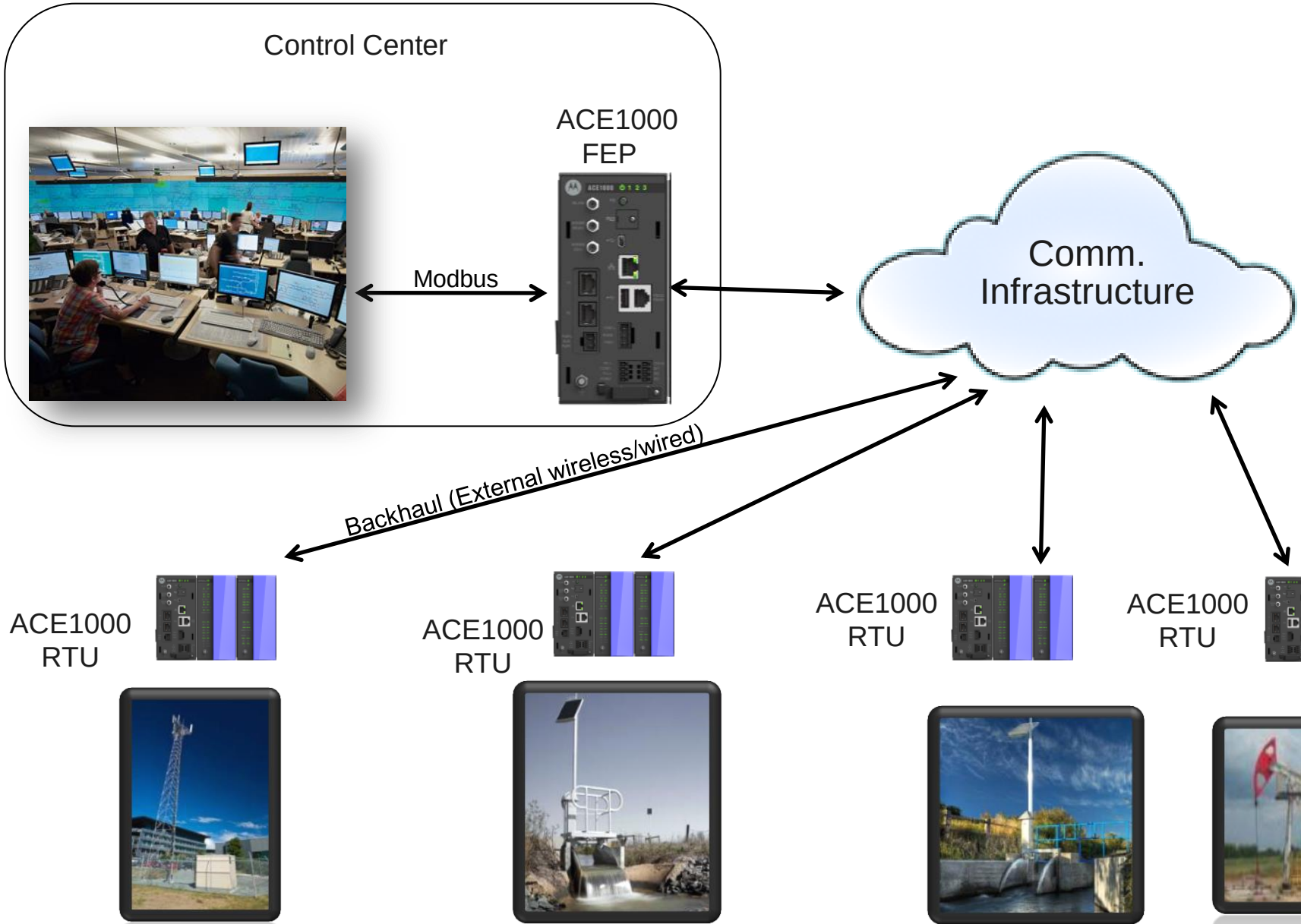
- Easy Programming Tool (via Web browser)
- Codesys IEC 61131-3 Programmer
- C Toolkit





Preliminary

ACE 1000 SYSTEM OVERVIEW WITH EASY PROGRAMMING



EASY PROGRAMMING SYSTEM CONCEPT

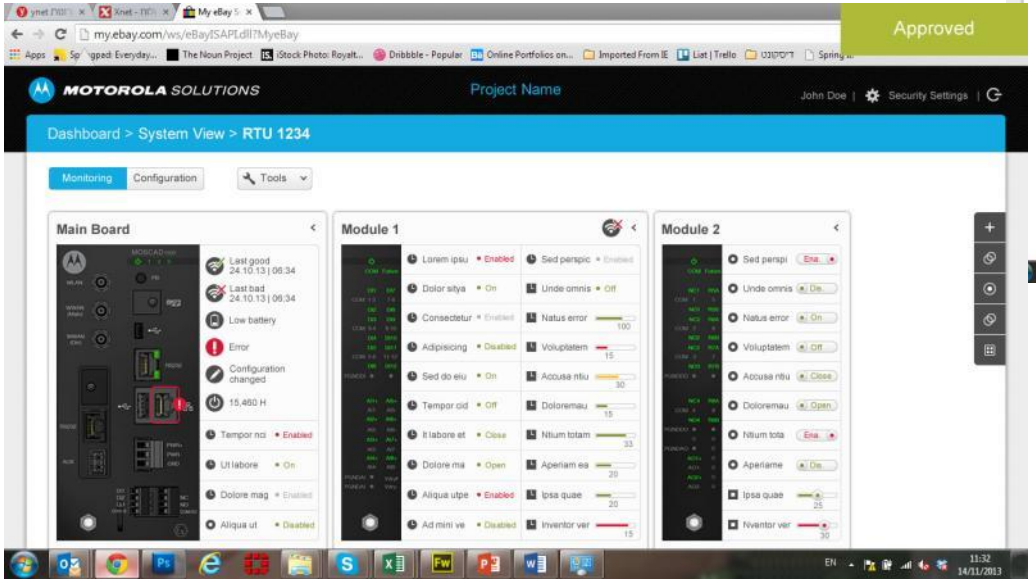
- **Front End Processor (FEP) as a system configuration tool**
  - Web interface to configure entire system
  - Management of the configuration of entire system

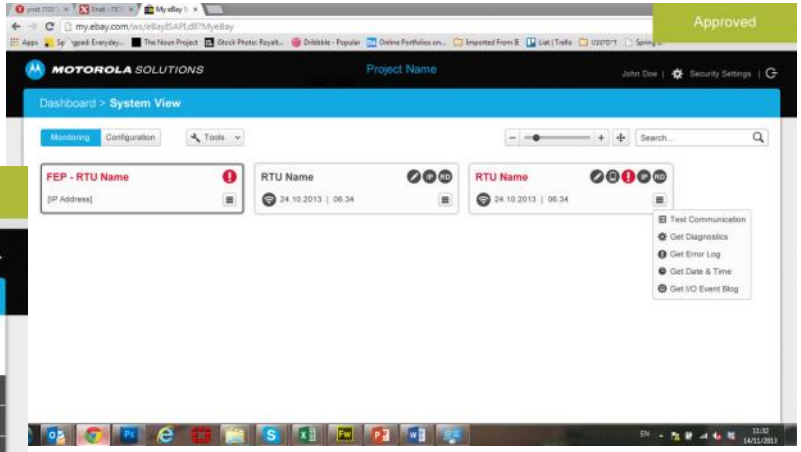
- **FEP as a data concentrator**
  - Built-in applications on RTU to report changes to FEP
  - Built-in applications on FEP to retrieve run-time data from all RTUs
  - Built-in applications to monitor the RTUs (health-check)

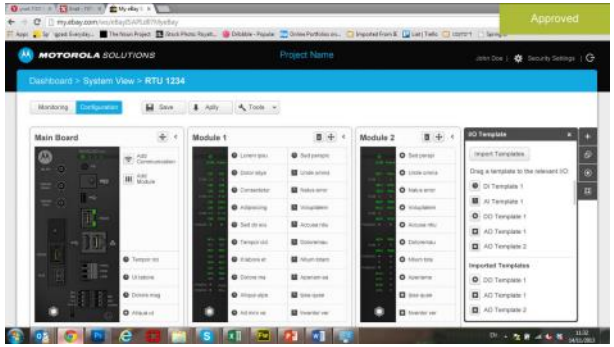
- **FEP as a front-end to HMI**
  - Automatic run-time data to SCADA protocol (Modbus)
  - Automatic TAG generation to SCADA

ACE1000 - WEB CONFIGURATION TOOL

- Easy and intuitive GUI
- Web-based planning tool
- Plug & Play system bring-up
- Easy Programming: Rule-based logic definition

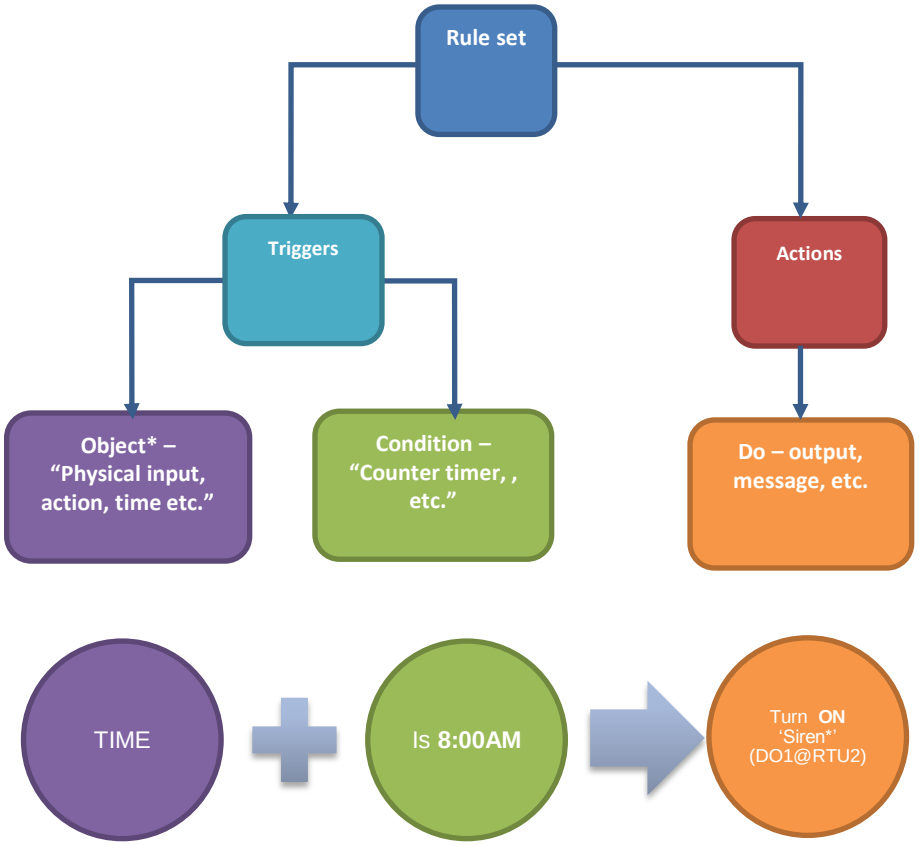


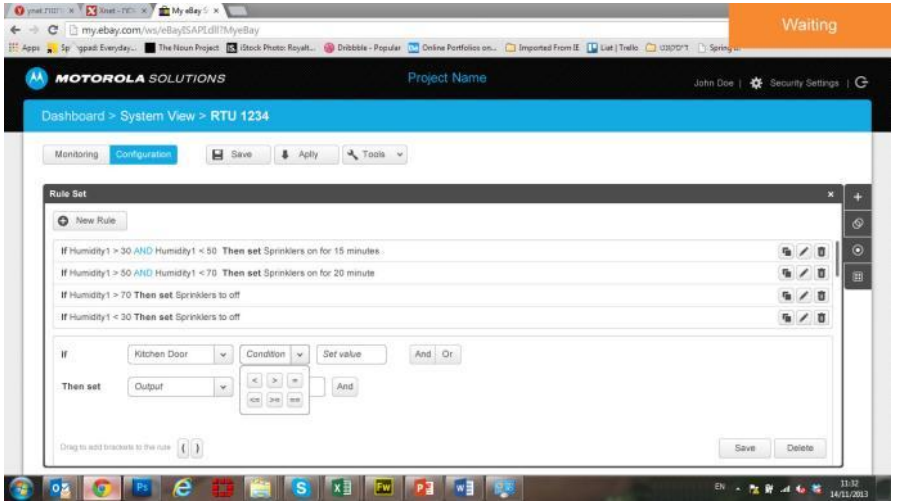


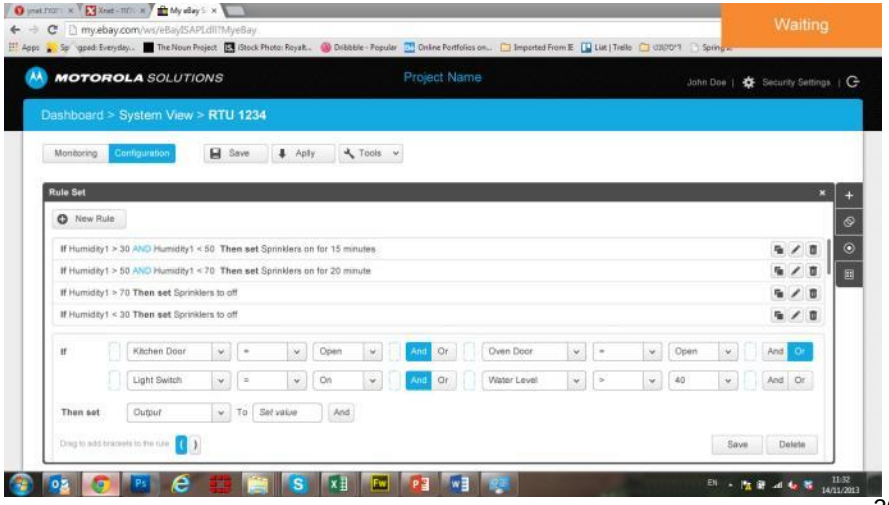


ACE1000 - EASY PROGRAMMING TOOL

- Provides the user with an easy way to define logical process/rule set



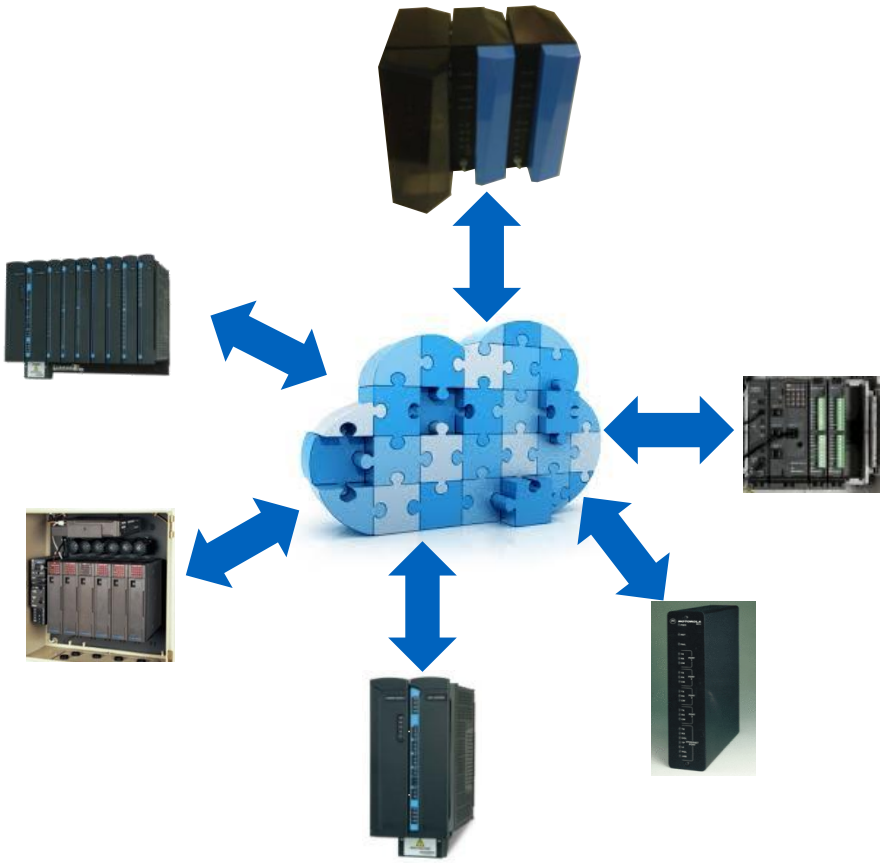




*All Objects used in the Easy Programming tool are utilizing the same name as defined in the I/O object definition

MIXED SYSTEMS

- **The ACE1000 can be integrated in systems with:**
  - MOSCAD IP Gateway
  - ACE IP Gateway
  - ACE3600 RTU
  - MOSCAD RTU
  - MOSCAD-L RTU
  - MOSCAD-M RTU



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THANK YOU…