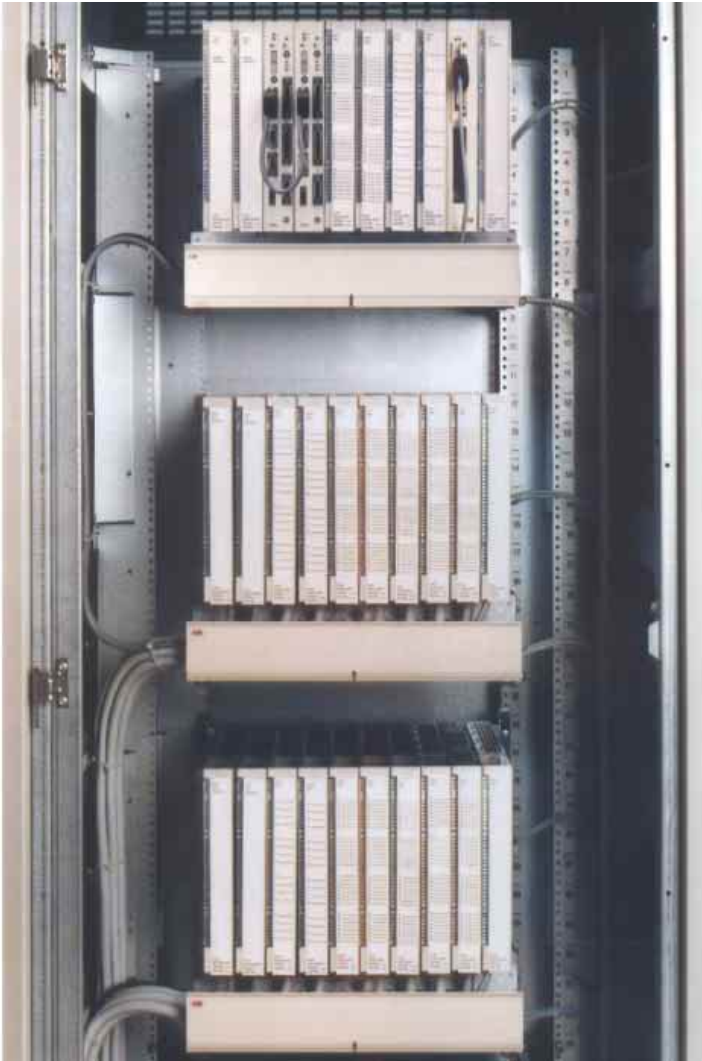


Advant® OCS

Open Control System

Advant Controller 160

The process controller that keeps on running



Advant Controller 160 with two I/O racks installed in a cabinet. (I/O terminals in an adjacent cabinet)

The scalable process controller for advanced applications

Advant Controller 160 is the most advanced process controller in the Advant Controller 100 series. It is a scalable controller offering a full complement of control and communication functions. It is designed to suit a wide range of industrial applications, from small to medium-size, from logic to loops, either standing alone or as part of an Advant OCS system. To increase overall system reliability, all central components may be configured to include redundancy.

- It manages all forms of control logic, sequences, loops, counting and arithmetic. And it supports true sequential event recording by time tagging events on input modules with a 1 ms resolution.
- It offers an RS 232 interface for MODBUS I or for remote terminal communications.
- It is as suitable for stand-alone applications as for distributed systems, on its own or in conjunction with other members of the Advant OCS Open Control System.
- It offers ample processing power with 31 user-definable, independent tasks, each running at its own execution cycle time which can be as low as 2 ms.
- It is perfect to live and grow with, thanks to its multitude of expansion possibilities and its on-line programming capabilities.
- It is configured in a subset of the AMPL graphic programming language, using Advant Station 100 Engineering Station.
- It stores application programs in non-volatile memory, not requiring battery back-up. The program memory is electrically erasable, permitting instant reprogramming.



Advant Controller 160, when availability is critically important



Advant Controller 160
with redundant CPUs and
a CPU for MVI

Expandability to suit any plant

Advant Controller 160 can be expanded and modified, as the plant it controls is expanded and modified. One way, the most obvious one, is to add I/O modules to the controller. This can be done on-line, without shutting it down. Another expansion method is to add more I/O racks. A third method is to connect multiple Advant Controller 160 stations into a distributed system, using the high performance Advant Fieldbus 100. Up to 80 stations can be interconnected in this way. To support the toughest requirements for reliability, Advant Fieldbus 100 may be installed with full cable and bus-interface redundancy.

Both coaxial and twisted-pair bus cables may be used, allowing different bus length. For immunity against electromagnetic interference, optical cables and modems are available.

Turning low-cost personal computers into high-power operator stations

The AdvSoft for Windows supervisory software can turn almost any personal

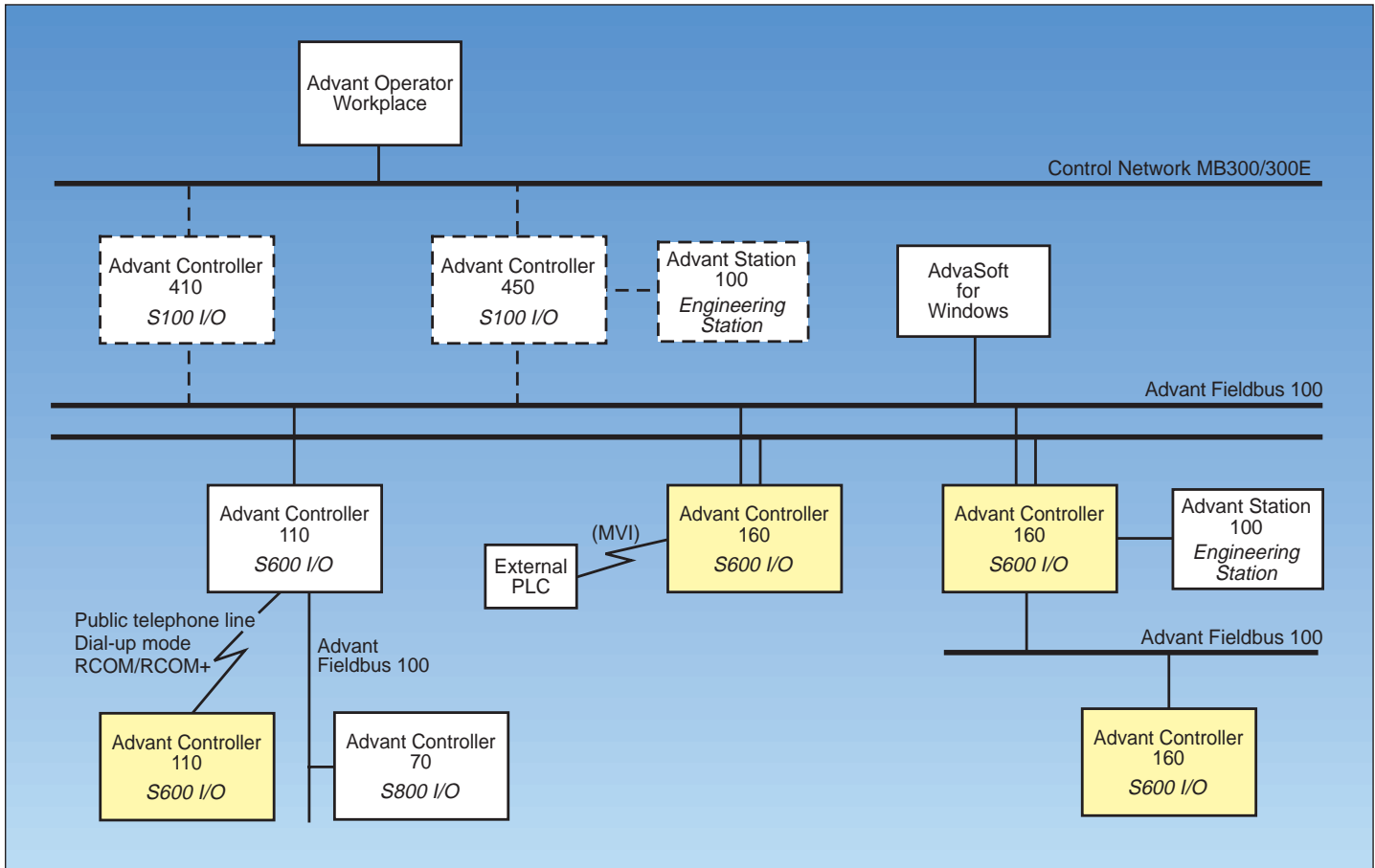
computer into a versatile process operator station. The PC is connected to Advant Fieldbus 100 and therefore able to access all Advant Controller 100 series stations on the bus for point-and-click-style process supervision and intervention.

All the right system connections

As a member of the Advant OCS automation system, Advant Controller 160 communicates with the system over Advant Fieldbus 100. Various serial links to third-party systems make the controller the ideal choice for integrating PLCs into process- or plant-wide control systems.

The right system reliability

For critical control applications, the station can be configured to include redundancy in all central functions such as data processing, power supply, Advant Fieldbus 100 interfacing and I/O bus extension. Changeover from the one device to the other is totally bumpless and transparent, even between CPUs.



System configuration showing some of the communication capabilities of Advant Controller 160

Graphic application program development

Advant Controller 160 is configured with the Windows-based Advabuild Function Chart Builder in AMPL, the graphic configuration/programming language used throughout Advant OCS with Master software. It is as well suited to logic and sequencing as to arithmetic and continuous control. Application programs are developed graphically, sheet by sheet, by selecting the required function blocks and then connecting them internally and to the process.

The application programs look the same on paper as on the screen. That is particularly important when it is time for debugging. The paper provides overview and the screen details, including live updating of signal values and back-tracking of configured signals to the source.

All the right process connections

There is a full complement of S600 I/O modules to choose from for digital and analog inputs and outputs. The I/O range covers both d.c and a.c., from low-cost, high-density modules to high-performance modules with kilovolt isolation. There is even an intelligent pulse counter module for accurate length measuring and positioning which can cope with pulse frequencies as high as 100 kHz. And a rotational speed input module with on-board trip logic which is suitable for turbine control and other rotating machine applications.

All S600 I/O-modules are enclosed in sheet metal covers to IP20 which protect against electromagnetic interference inside the rack and against rough handling outside it. The field wiring is terminated on multi-pole connectors that plug in on the front of the modules. This is both space-saving and tidy.

Technical shortcut

Power supply alternatives	
Direct (nonisolated input)	19.2-30 V d.c.
D.c. (isolated input)	110-125/220-250 V d.c.
A.c. (isolated input)	110/120/220/240 V, 47-450 Hz
Basic capacity and performance	
The PM 640 CPU: (support for SC 610)	
Clock rate:	33 MHz
Program memory, Flash-PROM	3.0 MB
The PM 645A CPU: (redundant processing)	
Clock rate:	33 MHz
Program memory, Flash-PROM	3.5 MB
Basic communication ports	
PM 640:	
RS 232C for Advant Station 100 Engineering Station	1
RS 232C interface for MODBUS I	1
PM 645A:	
RS 232C for Advant Station 100 Engineering Station	1
RS 232C interface for MODBUS I	1
RS-422 (High-speed serial links)	2
Integrated voter (redundancy management)	1
Total I/O capacity	
I/O channels ³	Up to 1 500
I/O modules	Up to 75
I/O stations	Up to 7
No. of subracks per I/O station	Up to 2
No. of module slots/subrack ⁷	Up to 10
Hardware options	
Advant Fieldbus 100 redundant, coax cable, two CI630 ⁹	Up to 1
Advant Fieldbus 100 redundant, coax cable, one CI630 ¹⁰	Up to 1
Interface module carrier SC610 ²	Up to 1
- RCOM/RCOM+ interface, CI532V01, 2 ch. ²	Up to 2
- MODBUS I interface, CI532V02, 2ch. ²	Up to 2
- Siemens 3964R, CI532V03, 2ch. ²	Up to 2
Analog inputs ⁸	
0...20mA	
- 32 channels, single-ended, 12 bits resolution (AI610)	
- 16 channels, isolated as group, 12 bits resolution, CMV=50V, CMRR>100dB (AI625)	
$\pm 10V/\pm 20mA$	
- 16 channels, differential, 12 bits resolution, CMV=100V, CMRR>80dB (at 16,33, 50 or 60 Hz) (AI620)	
<i>Pt100 or resistance</i>	
- 12 channels, -200...600°C or 0...500Ω, 0,5V, 3- or 4-wire, isolated as one group, 13 bits resolution, CMRR>100dB (AI630)	
<i>Thermocouples</i>	
- 14 measuring + 2 reference channels, measuring ranges C and J, isolated as one group, 12 bits resolution, CMRR>120dB (AI635)	
Analog outputs	
0...20mA	
- 16 channels, isolated as one group, 12 bits resolution (AO610)	
$\pm 10V/\pm 20mA$, 4-20mA, 0-5V, 0-10V, 1-5V	
- 8 channels, individually isolated, 12 bits resolution (AO650)	

Digital inputs

24 V d.c.

- 32 channels, nonisolated (DI610)
 - 32 channels, isolated in four groups, (DI620)
 - 32 channels, isolated in four groups, (DI650)⁴
- 48 V d.c.
- 32 channels, isolated in four groups, (DI621)
 - 32 channels, isolated in four groups, (DI651)⁴
- 60 V d.c.
- 32 channels, isolated in four groups, (DI622)
 - 32 channels, isolated in four groups, (DI652)⁴
- 120 V a.c.
- 16 channels, isolated in four groups, (DI635)
- 230 V a.c.
- 16 channels, isolated in four groups, (DI636)

Digital outputs

24 V d.c.

- 32 channels, max 200mA, short-circuit-proof, non-isolated (DO610)
- 16 channels, max 2.4A, short-circuit-proof, isolated in 8 groups (DO625) <60 V d.c.
- 32 channels, max 0.5A, short-circuit-proof, isolated in four groups (DO620) 24...250 V a.c./d.c.
- 16 channels (relays). Load current: max. 2A, min. 20mA. Breaking capacity: a.c.: 500VA, d.c.: 40W (DO630)

Pulse counting

<100 kHz, 5 or 24 V or $\pm 13mA$ d.c.

- 5 counters, each with 2 inputs, 1 strobe and 1 set (24 V only) inputs, each input individually opto isolated. Counting modes: Up, Down, Frequency-, Differential, Position, Rotational speed measurement

Basic software functionality

Program structuring and control, logic, timing, calendar, registers, multiplexers, counters, code converters, comparators, switches, arithmetic and interfacing with Advant Controller 400 and ABB drive controllers. Support for RCOM/RCOM+ comm. protocol and event handling on digital input module DI650/DI651/DI652, Advant Fieldbus 100, and/or RCOM/RCOM+.

Software options

- Regulatory control
- Communication by MODBUS I

Cabinets

RE500, IP21, IP41, IP54 ^{5,6} WxDxH:
870x525x2150 (1940) mm, (34.3"x20.7"x84.6" (76.4"))

Notes

- 1 See Advant OCS Product Guide for Advant Controllers 160 details.
- 2 CI532Vxx is plugged into an SC610 module. CPU PM640 needed.
- 3 A practical (as opposed to ultimate theoretical) limit.
- 4 With event-detection (time-tagging) or pulse-capture capabilities.
- 5 Can be combined into bays of multiple cabinets.
- 6 Conformers to the NEMA protection classes 1, 2 and 5.
- 7 Specific slot assignment rules.
- 8 Termination of unused supervised AI needed.
- 9 Standard version.
- 10 Extended version, with second AF 100.



Argentina Asea Brown Boveri S.A. *Buenos Aires.* **Australia** ABB Industrial Systems Pty. Ltd. *Lilydale (Melbourne).* **Austria** ABB Industrie Gesellschaft *Vienna.* **Bahrain** ABB ARESCON E.C. *Manama.* **Belgium** Asea Brown Boveri S.A. *Brussels.* **Brazil** Asea Brown Boveri Ltda. *Sao Paulo.* **Canada** Asea Brown Boveri Inc. *Toronto.* **Chile** Asea Brown Boveri S.A. *Santiago.* **China** ABB Industrial and Building Systems Ltd. *Beijing.* **Colombia** Asea Brown Boveri Ltda. *Bogota.* **Czech Republic** Asea Brown Boveri S.r.o. *Praha.* **Denmark** ABB Energi & Industri A/S *Skovlunde.* **Finland** ABB Industry OY *Helsinki.* **France** ABB Industrie S.N.C. *Décines Charpieu Cedex.* **Germany** ABB Industrietechnik AG *Mannheim.* **Greece** Asea Brown Boveri S.A. *Athens.* **Hungary** Asea Brown Boveri Ltd. *Budapest.* **India** Asea Brown Boveri Ltd. *Bangalore.* **Indonesia** PT. ABB Sakti Industri *Jakarta.* **Indonesia** PT Asea Brown Boveri Sakti *Tangerang.* **Ireland** ABB Process Automation Ltd. *Dundalk.* **Italy** ABB Industria S.p.A. *Milan.* **Japan** ABB Gadelius Industry K.K. *Tokyo.* **Korea** ABB Industrial Systems Co. Ltd. *Seoul.* **Malaysia** ABB Industry and Building Systems Sdn. Bhd. *Kuala Lumpur.* **Mexico** ABB Sistemas, S.A. de C.V. *Estado de Mexico.* **The Netherlands** ABB Systemen BV *Rotterdam.* **New Zealand** ABB Industrial Group Ltd. *Auckland.* **Norway** ABB Industri AS *Oslo.* **Poland** ABB Industry Sp.z.o.o. *Warsaw.* **Portugal** Asea Brown Boveri S.A. *Lisbon.* **Russia** Asea Brown Boveri Ltd. *Moscow.* **Saudi Arabia** ABB Saudi Arabia *Riyadh.* **Singapore** ABB Industry Pte. Ltd. *Singapore.* **South Africa** ABB Industry (Pty) Ltd. *Johannesburg.* **Spain** ABB Sistemas Industriales S.A. *Barcelona.* **Sweden** ABB Industrial Systems AB *Västerås.* **Switzerland** ABB Industrie AG. *Baden, Dättwil.* **Taiwan** Asea Brown Boveri Ltd. *Taipei.* **Thailand** ABB Industry Ltd. *Bangkok.* **Turkey** ABB Elektrik Sanayi A.S. *Istanbul.* **United Kingdom** ABB Industrial Systems Ltd. *Stevenage.* **U.S.A.** ABB Industrial Systems Inc. *Columbus, Ohio.* **Venezuela** Asea Brown Boveri S.A. *Caracas.*