Siemens 6DD1606-4AB0

I/O Expansion Module / Three interfaces, separate signal groups

Siemens 6DD1606-4AB0 is the IT42 analog and binary I/O expansion module for SIMADYN D PM5/PM6 CPU assemblies. It combines integrating voltage/frequency-conversion inputs, sampled analog inputs, analog outputs and binary I/O through separate X6, X7 and X8 interfaces.

X6 / INTEGRATING

Differential floating inputs use voltage/frequency conversion and SC50/SU10.

X7 / SAMPLED & OUTPUT

ADU sampled inputs and bipolar analog outputs share SC51/SU10.

X8 / BINARY & TRIGGER

Binary inputs, outputs and integrating-input triggers use the selected cable branches.

Module designation	IT42	**Maximum ITxx expansion modules per CPU**	2
Supported CPU modules	PM5 / PM6	**Additional slots occupied by IT42**	1

Important Notice: Keep the floating integrating-input group distinct from the non-floating sampled inputs and outputs. Isolate the subrack and applicable external supplies before rebuilding the PM5/PM6 expansion assembly.

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I/O Expansion Module / Integrating versus sampled acquisition

Integrating analog inputs	4 differential, floating, voltage/frequency conversion
Integrating input range	-10 to +10 V
Integrating input resistance	470 kohm
Integrating input filter cutoff	2 kHz at -3 dB
Integrating resolution at 1 ms	13 bits
Integrating resolution at 4 ms	15 bits
Integrating resolution at 20 ms	17 bits
Integrating relative accuracy	Typically 14 bits
Integration time control	AFC block sampling time or interval between positive trigger edges
External trigger inputs	4

Sampled analog inputs	4 differential, non-floating
Sampled input range	-10 to +10 V
Sampled input resistance	470 kohm
Sampled input filter cutoff	1.5 kHz at -3 dB
Sampled input resolution	12 bits
Sampled absolute accuracy	Typically 10 bits over full temperature range
Maximum sampled conversion time	45 microseconds

SEPARATE REFERENCE DOMAINS

Both groups are differential, but the integrating inputs are floating and the sampled ADU inputs are non-floating. Retain that distinction when arranging field reference potentials.

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I/O Expansion Module / Analog outputs and binary inputs

Analog outputs	4, non-floating, associated ground
Analog output range	-10 to +10 V
Analog output current	+/-10 mA
Analog output resolution	16 bits
Analog output monotonicity	14 bits over full temperature range
Analog output absolute accuracy	Typically 13 bits over full temperature range
Analog output short-circuit protection	To ground

Binary inputs	16, non-floating
Binary input rated voltage	24 V DC
Binary input logic 0	-1 to +6 V or open circuit
Binary input logic 1	+13 to +33 V
Binary input logic 1 current	Typically 3 mA
Binary input delay at 24 V	50 microseconds

DIFFERENT ELECTRICAL DUTIES

Analog outputs produce the configured bipolar voltage commands. Binary inputs interpret signal levels, including an open input as logic 0; neither group establishes the external binary-output supply envelope.

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I/O Expansion Module / Binary drive levels and supply budget

Binary outputs	16, non-floating
Binary output external supply	24 V DC nominal; +20 to +30 V including ripple
Brief external supply limit	+35 V for maximum 0.5 s
Binary output current per channel	50 mA nominal and maximum
Binary output short-circuit protection	Electronic and thermal
Binary output logic 0 level	Maximum 3 V
Binary output logic 1 level	Supply voltage minus 2.5 V
Binary output residual current	20 microA at logic 0
Maximum binary switching delay	15 microseconds
Inductive switch-off voltage limit	Supply voltage plus 1 V

+5 V supply range	+4.75 to +5.25 V
+5 V typical current drain	420 mA
+15 V supply range	+14.4 to +15.6 V
+15 V typical current drain	450 mA
-15 V supply range	-15.6 to -14.4 V
-15 V typical current drain	140 mA
External 24 V current drain	100 mA plus binary output currents
System air-intake temperature	0 to +55 C
System storage temperature	-25 to +70 C

The external supply demand includes the module base demand plus connected binary-output currents. Apply the 20-30 V continuous range separately from the brief 35 V limit.

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I/O Expansion Module / Cable branches and CPU assembly

X6 connector	15-pin sub-D; integrating analog inputs
X7 connector	25-pin sub-D; sampled inputs and analog outputs
X8 connector	50-pin sub-D; binary I/O and trigger inputs
X6 cable and interface	SC50 / SU10
X7 cable and interface	SC51 / SU10
X8 direct-terminal cable	SC49 / two SU10 interfaces
X8 segmented-interface cable	SC54 / matched SB10, SB60, SB61, SB70, SB71 or SU12 interfaces

Time-integrated voltage acquisition

Measures differential signals through voltage/frequency conversion using the AFC sampling interval or externally defined trigger interval.

Sampled analog feedback

Acquires differential voltage signals through the separate ADU input group when the configured application uses sampled rather than integrating acquisition.

Bipolar analog command output

Provides the configured analog voltage commands through X7 and the SC51/SU10 terminal arrangement.

Combined binary and trigger interface

Connects machine binary inputs, binary outputs and the external triggers through the selected X8 cable and branch-specific interface modules.

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I/O Expansion Module / Assembly and commissioning boundaries

01 / IT42 CHECK

Isolate the CPU/subrack and the external binary-I/O supply before rebuilding the expansion assembly.

02 / IT42 CHECK

Handle the expansion board with ESD grounding and conductive work surfaces.

03 / IT42 CHECK

Retain the metal distance pieces for the first ITxx board's identification contact.

04 / IT42 CHECK

Use the documented plastic spacing arrangement when a second ITxx board is fitted.

05 / IT42 CHECK

Keep the SC50/X6 integrating-input connection separate from SC51/X7 analog I/O.

06 / IT42 CHECK

Match each SC54 branch to its permitted signal/interface group; do not swap branches arbitrarily.

07 / IT42 CHECK

Check the external binary supply and per-channel output load before energization.

08 / IT42 CHECK

Verify the configured integration interval, trigger response and each restored signal group during commissioning.

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I/O Expansion Module / Engineering decisions

Can every IT42 integrating input be treated as a fixed 17-bit channel?

Its resolution depends on integration time: 13 bits at 1 ms, 15 bits at 4 ms and 17 bits at 20 ms. Select the acquisition interval together with the required response and resolution rather than applying the highest figure to every sampling configuration.

How does external triggering define the integrating measurement interval?

The integrating interval may be the AFC function block sampling time or the time between two positive edges of an external trigger signal. Four trigger inputs are carried at X8, separate from the integrating signal pairs at X6.

Are the X6 and X7 analog input groups equally isolated?

No. X6's integrating inputs are differential and floating with voltage/frequency conversion. The sampled ADU inputs at X7 are differential but non-floating, so their common-reference arrangement cannot be assumed identical.

Can the 33 V binary-input logic-high limit be used as a continuous output-supply limit?

No. The input logic-high range extends to 33 V, but the external binary-output supply is specified at 20-30 V including ripple. A brief 35 V limit applies only for up to 0.5 seconds; it is not a continuous supply rating.

Why does the first expansion board require metal distance pieces?

They establish the electrical contact used to identify the first ITxx expansion board. The second-board assembly uses the different plastic spacing arrangement; retaining only the mechanical separation without the identification contact is not equivalent.

Does replacing SC49 with SC54 leave every terminal branch equivalent?

SC49 connects X8 to two SU10 direct-terminal interfaces. SC54 divides X8 into signal-specific branches, each accepting only the interfaces matching that branch; binary inputs, binary outputs and integrating-input triggers must remain in their assigned groups.

Which limits distinguish the sampled inputs from the integrating inputs?

The sampled group has 12-bit resolution, a 1.5 kHz input filter cutoff and a maximum conversion time of 45 microseconds. The integrating group uses a 2 kHz cutoff and time-dependent resolution, so the two acquisition methods must be parameterized separately.

How much current can one binary output switch?

Each binary output is rated at 50 mA, which is also its maximum value. Output protection is electronic and thermal; include the connected output currents when calculating the external 24 V supply demand rather than using the module's 100 mA base demand alone.

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I/O Expansion Module / Evidence, portfolio and handover

SOURCE LEDGER

SIMADYN D Hardware

A5E01114837-02, cover edition 04.2011; general data chapter 08.2005; IT42 chapter 12.2004, original pages 125-136.

INTERFACE-LED INTEGRATION

X6 carries the integrating inputs through SC50/SU10, while X7 uses SC51/SU10 for the sampled inputs and analog outputs. X8 combines binary I/O and external integrating-input triggers; SC49 connects two SU10 units, whereas SC54 separates the signal groups into branches that accept only their matching interfaces.

CONTROL-TECHNOLOGY PORTFOLIO

SIMADYN D / D7-SYS catalog browsing only. FM458 uses a different installation platform; these links do not establish IT42 host compatibility or substitution.

View Siemens 6DD2920-0AN1 page

View Siemens 6DD1607-0AA2 page

View Siemens 6DD1607-0CA1 page

CONTACT APTER POWER

WHATSAPP / PHONE +86 180 3023 5313

EMAIL sales 13@apterpower.com

WEB www.apterpower.com

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The technical reference distinguishes the IT42 signal groups, limits and expansion-assembly decisions. The manufacturer excerpt retains 35 unchanged original pages covering source identity, installation/EMC guidelines, system conditions and the complete IT42 section; it is not the full manual.