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.

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

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.

- Combines integrating and sampled acquisition without treating them as one input type
- Keeps analog, binary and trigger connections in separate interface groups
- Extends the CPU assembly through the local expansion bus
- Uses defined cable branches for direct terminals or signal-adapting interfaces

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

TIME DEFINES THE INTEGRATING RESULT

The acquisition interval is the AFC block sampling time or the interval between positive trigger edges. The 17-bit figure belongs to 20 ms integration; it is not the fixed resolution of every input or every interval.

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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

ANALOG OUTPUT PATH

The analog output has an associated ground and is non-floating. Retain the channel grounding arrangement at X7 and SU10.

INPUT LIMIT IS NOT SUPPLY LIMIT

The binary-input high-state range is a signal limit. Do not use its upper value to define the continuous external supply for the outputs.

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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

External 24 V current demand includes the 100 mA module base current plus the binary-output currents. The brief 35 V limit is restricted to 0.5 seconds and cannot replace the 20-30 V continuous range.

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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

FIRST EXPANSION BOARD

Metal distance pieces establish the contact used to identify the first ITxx board.

SECOND EXPANSION BOARD

A second ITxx changes the first board to the plastic spacing arrangement.

MODULE ASSEMBLY

Build the expansion stack outside the subrack, bolt the boards using the supplied distance pieces, then insert the completed assembly.

SIGNAL BRANCHES

SC54 branches accept only their corresponding binary-input, binary-output or trigger interface groups.

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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.

GROUP-SPECIFIC ACCEPTANCE

Prove integrating timing and trigger response independently from sampled acquisition and binary switching. Preserve the distinct signal ranges, references and cable branches during the return-to-service check.

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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.

ORIGINAL-PAGE EXCERPT

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.

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.

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