Scanner Fieldbus Interface Guide

This document provides information on the Scanner Fieldbus Interface which is used to transfer scanner status and control data between a Fieldbus client and the Scanner Fieldbus Interface Module.

Content:

Customer Document – Rev. 3
IPG Part Number: DOCOXISSCNXX0001

1. Data Types

The following data types are used to construct the status and control blocks described below:

U16: 16-bit unsigned integer.
S16: 16-bit signed integer.
U32: 32-bit unsigned integer.
S32: 32-bit signed integer.
B32: 32-bit set of bits.

2. *Scanner Status*

Scanner Status is a block of data sent from the Scanner Interface to the Fieldbus client that reports current information regarding the scanner. The block is comprised of 48 bytes.

Bytes	Name	Type	Remark
0-3	ScannerStatus	B32	See Bit Table 1 below.
4-7	PortC	B32	See Bit Table 2 below.
8-11	ScannerStatus2	B32	See Bit Table 3 below.
12-15	Sensors	B32	See Bit Table 4 below.
16-19	LaserStatus	B32	See Bit Table 5 below.
20-23	FinishedFrameID	U32	ID of last completed frame.
24-27	FinishedObjectID	U32	ID of last completed object.
28-31	FinishedGroupID	U32	ID of last completed group.
32-35	FramesInBuffer	U32	Number of complete frames committed in buffer.
36-39	BufferInformation	B32	See Bit Table 6 below.
40-43	WaitStatus	B32	See Bit Table 7 below.
44-47	Reserved	U32	Reserved.

Bit Table 1: ScannerStatus

The mapping of bits for the *ScannerStatus* register is provided in the following table:

Bit	Name	Remark
0	Ready	Ready indicator (waiting for start).
1	Active	Active indicator (data is present).
2	Error	Error indicator (fault has occurred).
3	Reserved	Reserved.
7:4	DefinitionId	Defines interpretation of bits 23:8.
23:8	Definition†	Definition Id - dependent interpretation.
31:24	Reserved	Reserved.

† *Definition 1:*

15:8	SwStatusCode	Software status code (driven by IPGScan).
23:16	SwStatusBits[7:0]	Software status bits (configured in and driven by IPGScan).

Bit Table 2: PortC

The mapping of bits for the *PortC* register is provided in the following table:

Bit	Name	Remark
11:0	GPO[11:0]	General Purpose Output signals.
15:12	Reserved	Reserved.
23:16	GPO[23:16] GID[7:0] Feedback	General Purpose Output signals. Group ID Feedback.
28:24	GPO[28:25] JID[4:0] Feedback	General Purpose Output signals. Job ID Feedback.
31:29	GPO[31:29] Proc. Ctrl[2:0] Feedback	General Purpose Output signals. Process Control Feedback.

Bit Table 3: ScannerStatus2

The mapping of bits for the *ScannerStatus2* register is provided in the following table:

Bit	Name	Remark
0	Aborting	Currently flushing data with laser off.
1	BufferUnderrun	Data has run out before being properly terminated.
2	Reserved	Reserved.
3	HardwareError	Unspecified non-recoverable H/W error.
4	CtrlCommNotDet	Serial bus not detected.
5	CtrlCommError	Serial bus communication error.
6	HeadCommNotDet	Head not detected.
7	HeadCommError	Head communication error.
8	XyHwError	X or Y Galvo has no power.
9	ZHwError	Z Galvo has no power.
10	XyPositionError	X or Y Galvo has exceeded position when laser on.
11	ZPositionError	Z Galvo has exceeded position when laser on.
12	Reserved	Reserved.
13	BeamBlocked	Laser beam path is obstructed.
14	TrayNotInserted	Tray not inserted.
15	FiberIntrlkOpen	Scanner has open fiber interlock on laser.
16	LaserAlarm0 LaserReady	LaserAlarm0 Laser Ready signal
17	LaserAlarm1 LaserError	LaserAlarm1 Laser Error signal
18	LaserAlarm2 LaserEmissionOn	LaserAlarm2 Laser Emission On signal
19	LaserAlarm3 Airflow	LaserAlarm3 Airflow sensor
20	LaserNotReady	Laser is Not Ready.
21	LaserNotLocked	Scanner is not locked to laser output clock.
23:22	Reserved	Reserved.
24	StageAError	Stage A Error/failed to initialize
25	StageBError	Stage B Error/failed to initialize
26	StageCError	Stage C Error/failed to initialize
27	StageDError	Stage D Error/failed to initialize
28	Clipping	For MOF, position is out of scanner range.
31:29	Reserved	Reserved.

Bit Table 4: Sensors

The mapping of bits for the *Sensors* register is provided in the following table:

Bit	Name	Remark
15:0	WindowPD	Window photo detector (dBµA * 100, stored as S16 value)
31:16	HeadTemp	Laser head temperature (°C * 100, stored as U16 value)

U16 to S16:

$$WindowPD_{signed} = \begin{cases} WindowPD_{unsigned} & WindowPD_{unsigned} \leq (2^{15}-1) \\ (WindowPD_{unsigned} - 2^{16}) & WindowPD_{unsigned} > (2^{15}-1) \end{cases}$$

Bit Table 5: LaserStatus

The mapping of bits for the *LaserStatus* register is provided in the following table:

Bit	Name	Remark
0	LaserEnable	Laser Enable.
1	LaserGate	Laser Gate.
2	PrimaryMod	Primary Modulation.
3	GuideEnable	Guide Enable.
4	FocusEnable	Laser Focus Beam Enable.
7:5	Reserved	Reserved.
15:8	PrimaryAnalogPwr	Primary Laser Analog Power.
23:16	Reserved	Reserved.
31:24	AmbAnalogPwr	AMB Laser Analog Power.

Bit Table 6: BufferInformation

The mapping of bits for the *BufferInformation* register is provided in the following table:

Bit	Name	Remark
15:0	ObjectsInBuffer	Number of Objects in FIFO buffer (U16)
31:16	GroupsInBuffer	Number of Groups in FIFO buffer (U16).

Bit Table 7: WaitStatus

The mapping of bits for the *WaitStatus* register is provided in the following table:

Bit	Name	Remark
0	XyPosition	Waiting for completion of command or state.
1	TimerCounter	Waiting for completion of command or state.
2	Start	Waiting for completion of command or state.
3	Reserved	Waiting for completion of command or state.
4	LaserReady	Waiting for completion of command or state.
5	InterlockOk	Waiting for completion of command or state.
6	SoftwareWait	Waiting for completion of command or state.
7	GroupCommitted	Waiting for completion of command or state.
8	GPI0	Waiting for completion of command or state.
9	GPI1	Waiting for completion of command or state.
10	GPI2	Waiting for completion of command or state.
11	GPI3	Waiting for completion of command or state.
15:12	Reserved	Reserved.
16	InViewX	Waiting for completion of command or state.
17	InViewY	Waiting for completion of command or state.
18	InViewZ	Waiting for completion of command or state.
19	CoordChangeDone	Waiting for completion of command or state.
20	EncoderResetA	Waiting for completion of command or state.
21	EncoderResetB	Waiting for completion of command or state.
22	EncoderResetC	Waiting for completion of command or state.
23	Reserved	Reserved.
24	MoveDoneA	Waiting for completion of command or state.
25	MoveDoneB	Waiting for completion of command or state.
26	MoveDoneC	Waiting for completion of command or state.
27	MoveDoneD	Waiting for completion of command or state.
31:28	Reserved	Reserved.

3. *Scanner Controls*

Scanner Controls is a block of data sent from the Fieldbus client to the Scanner Interface used to control scanner behavior. The block is comprised of 32 bytes.

Bytes	Name	Type	Remark
0-3	Control	B32	See Bit Table 8 below.
4-7	PortA	B32	See Bit Table 9 below.
8-11	XOffset	S32	X offset (either MOF or S/W).
12-15	YOffset	S32	Y offset (either MOF or S/W).
16-19	Rotation	S32	Rotation offset (either MOF or S/W).
20-27	Reserved	B32	Reserved.
28-31	Reserved	B32	Reserved.

Bit Table 8: Control

The mapping of bits for the *Control* register is provided in the following table:

Bit	Name	Remark
0	Start	Start signal.
1	Enable	Enable signal.
31:2	Reserved	Reserved.

Bit Table 9: PortA

The mapping of bits for the *PortA* register is provided in the following table:

Bit	Name	Remark
0	GPI[0] Strobe	General Purpose Input or Strobe signal.
7:1	GPI[7:1]	General Purpose Input signals.
14:8	Reserved	Reserved.
15	GPI[15]	General Purpose Input signal.
23:16	GPI[23:16] GID[7:0]	General Purpose Input signals. Group ID.
28:24	GPI[28:25] JID[4:0] Select	General Purpose Input signals. Job ID Select.
31:29	GPI[31:29] Proc. Ctrl [2:0]	General Purpose Inputs signals. Process Control signals.