AIDA compact NEO
HL7 Interface Description

Change History

Version	Date	Changes	Reason	Editor
BA	2010-03-03	Whole document	New document	UNG

Table of Content

1 Introduction

1.1 Purpose of the Document

This document gives a short description of the HL7 Interface of AIDA compact NEO. The intended audiences are interested customers and IT departments.

1.2 Abbreviations

General Abbreviations

AIDA	Advanced Image and Data Acquisition / Archiving System = KARL STORZ AIDA™ (KST applications for endoscopic image and video acquisition with various functional options)
AVA	AIDA Voice Activation
CCU	Camera Control Unit
DICOM	Digital Imaging and Communication in Medicine
HIMSS	Healthcare Information and Management Systems Society of North America
HIPAA	Health Insurance Portability and Accountability Act of the United States of America
HIS	Hospital Information System
HL7	Health Level Seven - Communication Standard in Medicine
IHE	Integrating the Healthcare Enterprise
KIS	Krankenhaus Informations-System
KST	KARL STORZ GmbH & Co. KG
NEMA	National Electrical Manufacturers Association of the United States of America
OR	Operating Room
OR1	Operating Room all in One = KARL STORZ OR1™ (KST solution for operating room integration of OR table, equipment, light and documentation)
PACS	Picture Archiving and Communication System
RSNA	Radiological Society of North America
R-UI	Realistic User Interface (KST application to control devices over the SCB)
SAM	Storz Application Manager (KST application to switch between applications)
SCB	Storz Communication Bus
SEPS	Storz Endoskop Produktions GmbH Schaffhausen
VA / DoD	Veteran Administration / Department of Defense of the United States of America

Video specific Abbreviations

AV	Audio / Video
HD	High Definition Television
NTSC	National Television Standard Committee, standard for TV broadcast in USA and Japan
PAL	Phase-Alternating Line, standard for TV broadcast in Europe
SD	Standard Definition Television (PAL or NTSC)
TV	Television

Computer specific Abbreviations

BIOS	Basic Input / Output System
DLL	Dynamic Link Library
GUI	Graphic User Interface
KVM-switch	Keyboard, Video, Mouse - switch
KVM-S-switch	Keyboard, Video, Mouse and RS232 switch
NDS	National Display Systems

Network specific Abbreviations

IP	Internet Protocol
LLP	Lower Layer Transport Protocol
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
TLS	Transport Layer Security

DICOM specific Abbreviations

SCP	DICOM Service Class Provider (= Server)
SCU	DICOM Service Class User (= Client)

HL7 specific Abbreviations
Messages
ACK	Acknowledgement
ADT	Admission, Discharge, Transfer (of patients)
MDM	Medical Document Management ()
ORM	General Order Message (Request)
ORU	Unsolicited Transmission of Observation (Result)
QRY	Query
QRY-DEM	Demographic Query (patient is identified by Patient ID)
QRY-APA	Account Number Query (patient is identified by Visit ID / Case ID)

Message Segments
AL1	Allergy Information Segment
MSH	Message Header Segment
ORC	Common Order Segment
OBR	Observation Request Segment
OBX	Observation/Results Segment
PID	Patient Identification Segment
PV1	Patient Visit Segment
QRD	Query Definition Segment (original style)
QRF	Query Filter Segment (original style)
TXA	Transcription Document Header Segment
Z….	Private Segments

1.3 Definitions

General Definitions

DICOM	Digital Imaging and Communication in Medicine is a standard of NEMA defining how imaging devices in medicine communicate.
HL7	Health Level 7 is a set of standards developed by the Health Level Seven organization for the management, exchange and integration of electronic healthcare information.
IHE	Integrating the Healthcare Enterprise is an initiative by HIMSS and RSNA to improve the way computer systems in healthcare share information based on DICOM and HL7.
IHE Integration Profiles	IHE Integration Profiles define the workflow processes and data contents which must be supported by IHE compliant applications.
Modality	Refers in medical imaging to an equipment used to acquire images of the body, such as radiography, ultrasound, magnetic resonance imaging or endoscopy.
Procedure	A medical procedure is a course of action intended to achieve a result in the care of a patient, normally a diagnosis or a therapy. Procedures are often complex and include a number of different steps over an extended time period.
Procedure Step	A procedure step is a part of a procedure performed at a given time and location. In a diagnostic procedure a procedure step is e.g. a CT scan or a MR scan. In surgery, a procedure step includes a single surgical event, e.g. a Laparoscopy or a Cystoscopy.

HL7 specific Definitions

HL7 Listener	A permanently running application listening for HL7 messages.
HL7 Server	A HIS application capable of sending and receiving HL7 messages.
QRY Server	An HL7 server in the HIS capable of handling and responding to QRY messages.

1.4 References

/REF_001/	DICOM Standard 2007	http://medical.nema.org/	NEMA
/REF_002/	IHE Technical Framework	http://www.ihe.net/	IHE
/REF_003/	VA / DoD DICOM Conf. Req. for Digital Acq. Mod.	http://www.va.gov/imaging	VA/DoD
/REF_004/	HL7 Standard Version 2.3.1, 2.4 and 2.5.1	http://hl7.org/	HL7

2 HL7 Interface of AIDA compact NEO

2.1 Introduction

AIDA compact NEO is intended to capture image data (images, videos and audio clips) in the operating room. It can communicate through Ethernet with a HL7 or DICOM based HIS.

Through its HL7 interface, AIDA compact NEO can query for patient data when a new procedure is started and send result messages when a procedure is finished. These functions can be activated separately, but require purchase of the corresponding license option.

AIDA compact NEO is compatible with HL7 versions 2.3 to 2.5. The HL7 communication uses TCP/IP. The HL7 messages are framed by Hex 0B (start) and Hex 1C 0D (stop).

2.2 Query Messages

AIDA compact NEO can query for patient data any time during a procedure. It is recommended to do this when a new procedure is started. This requires that there is an HL7 server present which responds to the query. To get a meaningful query, the user must first enter or read-in the Patient ID or Visit ID.

2.2.1 Patient Query

The HL7 Interface of AIDA compact NEO sends the following patient query:
- Query message type =   QRY^A19
- What Subject Filter =   DEM

In the query responses selected fields from the PID and PV1 segments are evaluated.

Example of sent demographic query

```
MSH|^~\&|AIDA||DEMOKIS||201002161200||QRY^A19|Q140|P|2.3.1||
QRD|201002161200|R|I|Q9|||1^RD|PID-00-004|DEM||
```

Example of processed response

```
MSH|^~\&|DEMOKIS||AIDA||201002161200||ADR^A19||P|2.3.1|||||
MSA|AA|Q140|||||||
QRD|201002161200|R|I|Q140|||1^RD|PID-00-004|DEM||
PID|1651||PID-00-004||Patient^Four^R.^CBE^Sir^Ph.D.^L||19300711|M||||||||
PV1||I|||||||10-JONES^Jones^Miriam^^^Dr.|||||||||||V-ID-004|||||||||||||||||
```

2.2.2 Account Query

The HL7 Interface of AIDA compact NEO sends the following account query:
- Query message type =   QRY^A19 or QRY^Q01
- What Subject Filter =   APA

Example of sent account number query

```
MSH|^~\&|AIDA||DEMOKIS||201002161200||QRY^Q01|Q140|P|2.3.1||
QRD|201002161200|R|I|Q9|||1^RD|V-ID-004|APA||
```

Example of processed response

```
MSH|^~\&|DEMOKIS||AIDA||201002161200||ADR^Q01||P|2.3.1|||||
MSA|AA|Q140|||||||
QRD|201002161200|R|I|Q140|||1^RD|V-ID-004|APA||
PID|1651||PID-00-004||Patient^Four^R.^CBE^Sir^Ph.D.^L||19300711|M||||||||
PV1||I|||||||10-JONES^Jones^Miriam^^^Dr.|||||||||||V-ID-004|||||||||||||||||
```

2.3 Evaluated Message Segments

2.3.1 PID Segment

PID Segment in QRY Message						HL7 Version			AIDA compact NEO
Seg.	Field	Element Name		Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
PID	2	Patient ID	[1]	1		O	B	B	Patient ID [2]
PID	3	Patient ID List	[1]	1		**R**	**R**	**R**	

PID Segment in QRY Message						HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name		2.3	2.4	2.5	Rel. AIDA Attribute
PID	4	Alternate Patient ID	1			O	B	B	
PID	5	Patient Name	1	Family Name		**R**	**R**	**R**	Patient's Name
			2	First Name		O	O	O	
			3	Middle Name		O	O	O	
			5	Prefix		O	O	O	
PID	7	Date/Time of Birth	1			O	O	O	Patient's Birth Date
PID	8	Admin. Sex [3]	1			O	O	O	Patient's Sex

[1]) In HL7 V2.3, PID-2 is called "Patient ID (external ID)" and PID-3 "Patient ID (internal ID)".
[2]) The HL7 field used is configurable.
[3]) Defined values F = Female, M = Male, O = Other, U = Unknown, etc.

2.3.2 PV1 Segment

PV1 Segment in QRY Message					HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
PV1	8	Referring Doctor	1	ID Number	O	O	O	Referring Physician's Name
			2	Family Name	O	O	O	
			3	First Name	O	O	O	
			4	Middle Name	O	O	O	
			7	Degree	O	O	O	
PV1	19	Visit Number	1		O	O	O	Admission ID / Case ID

2.4 Outgoing Messages

AIDA compact NEO can send result messages. This requires that there is an HL7 server present which receives these messages.

2.4.1 ORU Messages

The HL7 Interface of AIDA compact NEO creates the following ORU messages:
- ORU message type = R01
- ORU message structure =
  MSH   Message Header segment
  PID   Patient Identification segment
  PV1   Patient Visit segment
  ORC   Common Order segment
  OBR   Observation Request segment
     {OBX}   Observation Results segment (one OBX segment per image or video).

Example of created ORU message

```
MSH|^~\&|AIDA||DEMOKIS||201002161400||ORU^R01|10|P|2.3.1|||AL|NE|||
PID|||PID-00-004||Patient^Four^R.^^^||19300711|M|||||||||||||||||||||||||
PV1||I||||||10-JONES^Jones^Miriam^^^Dr.||||||||||||V-ID-004|
ORC|RE||||CM|||||||||||||
OBR|1|||Y02.56^HYSTEROSCOPY|||201002161400|||||||||||||||||||F|||||||
   ONEIL&O'Neil&Aron&&&&Prof.Dr.||||
OBX|1|RP|ENDOSCOPIC IMAGE^AIDA^L|1|\\KST-IHE\HL7Export\.....\Images\Image_1.BMP
   |||||||F|||201002161400|
```

2.4.2 MDM Messages

The HL7 Interface of AIDA compact NEO creates the following MDM messages:
- MDM message type = T01
- MDM message structure =
  MSH   Message Header segment
  PID   Patient Identification segment
  PV1   Patient Visit segment
  ORC   Common Order segment
  OBR   Observation Request segment
  TXA   Transcription Document Header Segment

Example of created MDM message

```
MSH|^~\&|AIDA||DEMOKIS||201002161400||MDM^T01|10|P|2.3.1|||AL|NE|||
PID|||PID-00-004||Patient^Four^R.^^^||19300711|M||||||||||||||||||||||||
PV1||I||||||10-JONES^Jones^Miriam^^^Dr.|||||||||||V-ID-004|
ORC|RE||||CM||||||||||||||
OBR|1|||Y02.56^HYSTEROSCOPY|||201002161400|||||||||||||||||||||F|||||||
   12-ONEIL&O'Neil&Aron&&Prof.Dr.||||
TXA|1|OP|IM|||201002161400|||12-ONEIL^O'Neil^Aron^^^Prof.Dr.|||
   ^^1.2.276.0.67.2.121082829.20091122151133.3^L||||
   \\KST-IHE\HL7Export\...........\Images\Image_1.BMP|DO||AV|
```

2.5 Created Message Segments

2.5.1 PID + PV1 Segments

See above.

2.5.2 ORC Segment

ORC Segment in ORU and MDM Messages					HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
ORC	1	Order Control	1		**R**	**R**	**R**	Constant value **RE** [1]
ORC	5	Order Status	1		O	O	O	Constant value **CM** [1]

[1] Meaning of used values RE = observation results included, CM = order is completed.

2.5.3 OBR Segment

OBR Segment in ORU and MDM Messages					HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
OBR	4	Universal Service ID	1	Identifier	**R**	**R**	**R**	Procedure Name Part 1
			2	Text	**R**	**R**	**R**	Part 2
			3	Coding System	**R**	**R**	**R**	Part 3
OBR	7	Obs. Date/Time	1		C	C	C	Treatment Date
OBR	25	Result Status	1		C	C	C	Constant Value **F**
OBR	32	Principal Result	1.1	ID Number	O	O	O	Performing Physician's
		Interpreter	1.2	Family Name	O	O	O	Name (Surgeon) [1]
			1.3	First Name	O	O	O	
			1.4	Middle Name	O	O	O	
			1.5	Suffix	O	O	O	
			1.6	Prefix	O	O	O	

[1] Value sent as entered, no re-formatting.

2.5.4 OBX Segment

OBX Segment in ORU and MDM Messages					HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
OBX	2	Value Type	1		C	C	C	Constant value **RP** [1]
OBX	4	Obs. Sub ID	1		C	C	C	Counter
OBX	5	Observation Value	1		C	C	C	Reference pointer [2]
OBX	11	Obs. Result Status	1		**R**	**R**	**R**	Constant value **F** [1]
OBX	14	Obs. Date/Time	1		O	O	O	Treatment Date

[1] Meaning of used RP = reference pointer, F = final result.
[2] The observation value is a reference to an image or video file on a file server.

2.5.5 TXA Segment

TXA Segment in MDM Message					HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
TXA	1	Set ID	1		**R**	**R**	**R**	Counter
TXA	2	Document Type	1		**R**	**R**	**R**	Constant value **OP** [1]
TXA	3	Doc. Content Pres.	1		C	C	C	Constant value **IM** [1]
TXA	6	Orig. Date/Time	1		O	O	O	Acquisition Date/Time
TXA	9	Orig. Code/Name	1	ID Number	O	O	O	Performing Physician's
			2	Family Name	O	O	O	Name (Surgeon)

TXA Segment in MDM Message				Component Name	HL7 Version			AIDA compact NEO
Seg.	Field	Element Name	Subs.	Component Name	2.3	2.4	2.5	Rel. AIDA Attribute
			3	First Name	O	O	O	
			4	Middle Name	O	O	O	
			5	Suffix	O	O	O	
			6	Prefix	O	O	O	
TXA	12	Unique Doc. No.	1	Entity Identifier	O	O	O	Empty
			2	Namespace ID	O	O	O	Empty
			3	Universal ID	**R**	**R**	**R**	Instance UID
			4	Universal ID Type	O	O	O	Constant value **L**
TXA	16	Doc. File Name	1		O	O	O	File Name [2]
TXA	17	Doc. Compl. Status	1		**R**	**R**	**R**	Constant value **DO** [1]
TXA	19	Doc. Availability	1		O	O	O	Constant value **AV** [1]

[1] Meaning of used values OP = operative report, IM = image data, AU = audio data, TEXT = text, DO = documented, AV = available.

[2] AIDA compact NEO provides the path and file name on the file server.