INTER-ROLLER BAGGAGE HANDLING SYSTEM
HIGH LEVEL CONTROL SYSTEM

INTERFACE SPECIFICATION
TRANSPORT PROTOCOL: FRAME-ON-RFC1006

Document No.:	IR-102-04
Project No.:	IR-BHS System
Author:	XJ
Release Date:	12-Sep-2005
Revision:	1.01
Pages:	11

Document No.:   IR-102-04   Page 1/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

C O N T E N T S

© Inter-Roller Engineering Limited

Document No.:	IR-102-04	Page 2/11
Project No.:	IR-BHS System	
Author:	XJ	
Release Date:	12-Sep-2005	
Revision:	1.01	
File Name:	IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc	

1. REVISIONS

Version	Release	Date	Init.	Description
1	00	16-Aug-2005	XJ	Initial version.
1	01	12-Sep-2005	XJ	Change the Keep-Alive layer to on top of the Application layer. The keep-alive telegram can be sent only after the application layer connection was established.

Document No.:   IR-102-04   Page 3/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

2. PREFACE

2.1 DOCUMENT OBJECTIVE

The objective of this document is to specify the standard Frame-On-RFC1006 transport protocol stack available in IR-BHS, a standard Baggage Handling System (BHS) product from Inter-Roller.

For the transport protocol each protocol layer is described along with parameters settings used in this particular case.

2.2 SCOPE

It is the scope of this document to state all necessary information needed in order to implement the Frame-On-RFC1006 protocol stack.

2.3 AUDIENCE

This interface specification is intended as a technical document specifying the protocols. Also the document serves, as the technical basis when deciding which standard transport protocols should be used in a particular solution.

2.4 DOCUMENT ORGANISATION

This Interface Specification contains the following chapters:
Chapter 3, "INTRODUCTION"
This chapter supplies an overview of the Frame-On-RFC1006 protocol stack, introducing the layers.
Chapter 4, "PROTOCOL LAYER: KEEP-ALIVE"
This chapter specifies the responsibility, function and configurable parameters of the Keep-Alive protocol layer.
Chapter 6, "PROTOCOL LAYER: RFC1006"
This chapter specifies the responsibility, function and configurable parameters of the Frame-On-RFC1006 protocol layer.
Chapter 7, "PROTOCOL LAYER: TCP"
This chapter specifies the responsibility, function and configurable parameters of the TCP protocol layer.
Chapter 8 "REFERENCES"
This chapter contains a list of the references used in the specification.

2.5 DOCUMENT LIMITATIONS

2.6 DOCUMENT MAINTENANCE

This document is the one of the IR project document suites and maintained by Inter-Roller Engineering Limited.

Document No.:   IR-102-04   Page 4/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

3. INTRODUCTION

3.1 OVERVIEW

The RFC 1006 protocol stack consists of a number of logical layers on top of an Ethernet connection. The protocol layers are depicted in **Error! Reference source not found.**.
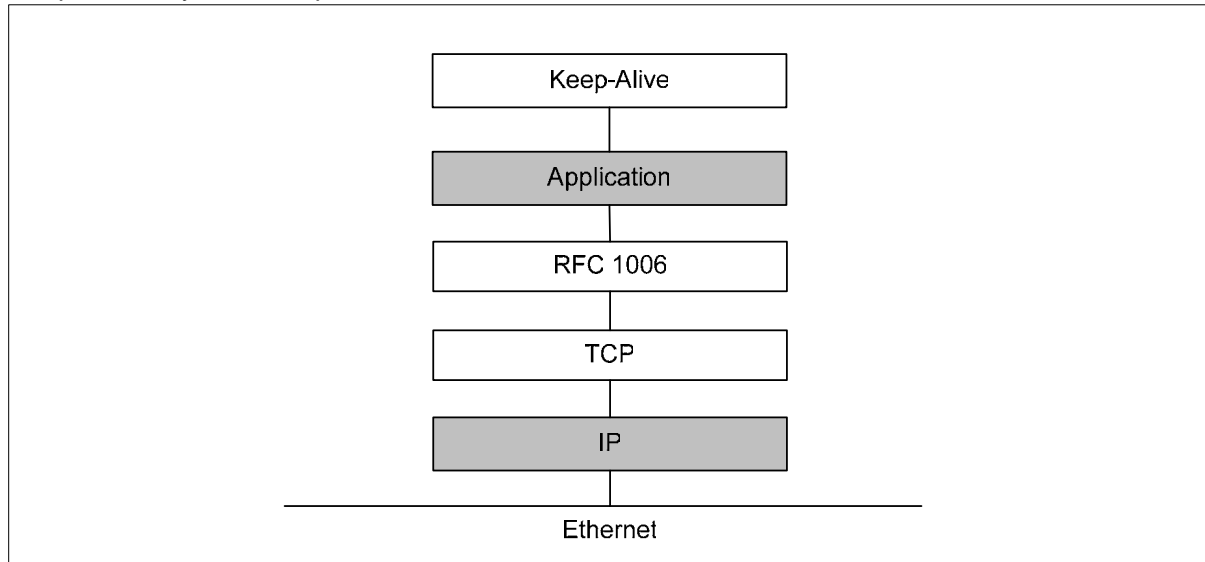

Figure 1: Overview of the transport protocol layers, i.e. the protocol stack, used for in the Frame-On-RFC1006 protocol stack. The layers in the grayed boxes are not within the specification scope for this document.

The following lists the main responsibilities for the layers in Figure 1:

- **Keep-Alive**: Ensures the application layer connection validity through sending special keep-alive telegrams and monitoring the traffic on the connection. Thus a connection with no traffic is considered a dead or broken connection.
- **Application**: The Application layer is the user of the Frame-On-RFC1006 protocol stack transport protocol and specifies the protocol for a particular project or product. The Application layer is specified in the separate interface document for a given project or product.
- **RFC 1006**: Is a message-based protocol, where a message consists of a header and a data block.
- **TCP**: Transmission Control Protocol (TCP). A connection-oriented protocol that provides a reliable, full-duplex, byte stream for a user process.
- **IP**: Internet Protocol (IP). IP is the protocol that provides the packet delivery service for TCP (and others). The combination of TCP using IP is often referred to as TCP/IP.

In a layered protocol a data packet is passed through the layers in sequence. Each layer then has the possibility of adding / deleting or changing data according to the specifications. In some cases data packets is created or terminated within a layer and thus not transferred to the next layer.

Thus it very important that clear interfaces and responsibility division between the protocol layers are enforced.

Document No.:   IR-102-04   Page 5/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

4. PROTOCOL LAYER: KEEP-ALIVE

4.1 SPECIFICATION

To ensure the application protocol layer connection validity both participating hosts must enforce a minimum level of traffic on the connection. This is done by means of a keep-alive telegram. Whenever a host has detected a quiet period where it has not send anything for a configurable amount of time, it must send a keep-alive telegram to the other host. This ensures that no host is totally quiet for more than this configurable "keep-alive timeout".

Whenever a host finds it communication opponent quiet for more than this timeout, plus a margin, it must terminate the communication and disconnect. After an optionally pause (**Reconnect Timeout: 10seconds**) it must agree to reestablish the connection. Such connection related processes will only be issued by the application protocol layer.

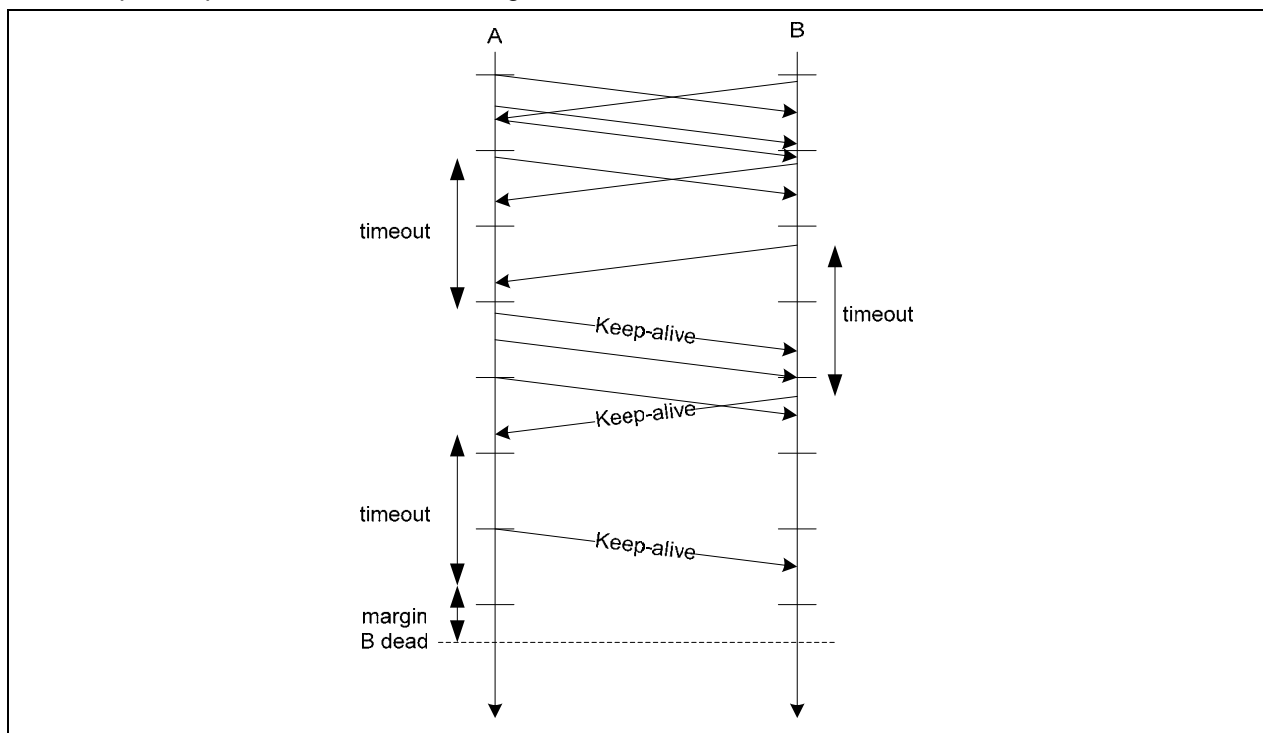The keep-alive protocol is illustrated in Figure 1 below.

Figure 1: Ensuring connection validity by means of life sign telegrams. The unnamed directed lines indicate normal telegrams of random type, whereas the lines marked "keep-alive indicates telegrams of exactly that type.

As can be seen from the figure, peer A and peer B have a busy period, at the top of the figure, where they exchange telegrams regularly. At some point the communication ceases. At the bottom of the figure peer B fails to send either keep-alive or any other telegram resulting in A concluding the communication and deeming B dead.

The keep-alive telegram will be sent only when the bottom application layer connection has been established.

The keep-alive telegram format refers to the Application Protocol Layer document of respective projects.

Document No.:   IR-102-04   Page 6/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

4.2 Protocol Parameters

The table below lists the configurable parameters for the keep-alive protocol. These parameters must be decided and specified in the appropriate project documentation.

Parameter name	Valid values	Description
Receive_Timeout	Number (1..n)	The timeout period in milliseconds. If keep-alive or other telegram is received within this period the connection must be closed and re-established.
Send_Interval	Number (1..n)	The interval in milliseconds with which the keep-alive telegram are sent.
Reconnect_Timeout	Number (1..n)	The timeout period in milliseconds. After the connection has been closed for this time period, the re-open connection will be performed.

Document No.:   IR-102-04   Page 7/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

5. PROTOCOL LAYER: APPLICAITON

Refer to the separated application protocol layer document of respective projects.

© Inter-Roller Engineering Limited

Document No.:   IR-102-04   Page 8/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

6. PROTOCOL LAYER: RFC1006

6.1 SPECIFICATION

This implementation of the RFC 1006 protocol does not a fully implement the RFC 1006 protocol as specified in the public RFC 1006 protocol specification, refer to [RFC-1006]. Rather the focus has been to create a simple and reliable communication protocol. This implementation is primarily developed to meet the requirements from the Siemens SIMATIC PLC. The RFC 1006 protocol is designated ISOonTCP in a Siemens PLC.

It is the responsibility of the RFC 1006 layer is to perform connection establishment synchronization, that is connection request and connection confirm telegrams. Also wrapping headers, calculating length fields, etc. for outgoing data telegrams, and stripping it and checking for incoming telegrams, the data part is then forwarded to other protocol layers.

The technical details concerning the protocol are specified in [IR-102-05-1.00 IS_TP_RFC1006.doc].

6.2 PROTOCOL PARAMETERS

The table below lists the configurable parameters for the RFC 1006 layer. These parameters must be decided and specified in the appropriate project documentation.

Parameter name	Valid values	Description
ConnectionId	Number 1..n	The connection id to send in the CR/CC telegrams in the 'SRC'-field.
SendConnectRequest	Boolean	The 'SendConnectRequest' parameter is set to determine which of the peers should send the Connect Request telegram.
LocalTSAP	String	The TSAP string to send as local ('Calling') TSAP when sending the CR telegram. If the 'SendConnectRequest' parameter is set to false, the 'Called' TSAP received in the CR telegram is used as 'Calling' TSAP in the CC telegram.
RemoteTSAP	String	The TSAP string to send as the remote ('Called') TSAP when sending the CR telegram. If the 'SendConnectRequest' parameter is set to false, the 'Calling' TSAP received in the CR telegram is used as 'Called' TSAP in the CC telegram.
MaxTPDUSize	Number 7..12	Specifies the maximum number of bytes to send in a single RFC1006 telegram before splitting the telegram. The maximum number of bytes is calculated as: $maxBytes = 2^{MaxTPDUSize}$ e.g. MaxTPDUSize = 11 -> maxBytes = 2048

© Inter-Roller Engineering Limited

Document No.:	IR-102-04	Page 9/11

Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

7. PROTOCOL LAYER: TCP

7.1 SPECIFICATION

The specification of TCP is a standardized protocol and as such not part of this specification. For the TCP protocol specification the reader is referred to [RFC-793-TCP].

The two hosts involved in the communication acts as either server or client. The server listens for client connections on a certain port. The server cannot establish the connection but is allowed to perform disconnects. The client process is the active part, thus responsible for establishing the connection to the server on the given peer IP address and port.

The server accepts only one connection at a time from the client.

7.2 PROTOCOL PARAMETERS

The table below lists the configurable parameters for the TCP layer, which needs to be specified for each peer. These parameters must be decided and specified in the appropriate project documentation.

Parameter name	Valid values	Description
Role	Client or Server	The role of the peer, either as client, the active part when connecting, or server, the listening part.
Peer IP address	IP Address	The IP address for the peers.

The port number for the RFC 1006 protocol stack is fixed by standard to **102** as defined in [IANA-Port-Numbers].

© Inter-Roller Engineering Limited

Document No.: IR-102-04   Page 10/11
Project No.:   IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc

8. REFERENCES

Abbreviation	Reference
[RFC-1006]	RFC 1006 – ISO Transport Service on top of the TCP. Version 3. http://www.faqs.org/rfcs/rfc1006.html
[IS-RFC-1006-TECH-DETAILS]	RFC 1006 technical details. Inter-Roller document ID: BHS-504-02-x.xx IS_RFC1006Details
[RFC-793-TCP]	RFC 793 – Transmission Control Protocol, DARPA Internet Program, Protocol specification, September 1982 http://www.faqs.org/rfcs/rfc793.html
[IANA-Port-Numbers]	IANA, Internet Assigned Numbers Authority, Port Numbers http://www.iana.org/assignments/port-numbers

© Inter-Roller Engineering Limited

Document No.: IR-102-04 Page 11/11
Project No.: IR-BHS System
Author: XJ
Release Date: 12-Sep-2005
Revision: 1.01
File Name: IR-102-04-1.01 IS_TP_FrameOnRFC1006.doc