
**Tractors and machinery for agriculture
and forestry — Serial control and
communications data network —**

**Part 13:
File server**

iTeh STANDARD PREVIEW
*Tracteurs et matériels agricoles et forestiers — Réseaux de commande
et de communication de données en série —*
(standards.iteh.ai)
Partie 13: Serveur de fichiers

ISO 11783-13:2007

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 11783-13:2007](https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007)

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
4 General.....	2
5 Requirements	2
5.1 General message format.....	2
5.2 File data format	3
5.3 Data transmission control	3
5.4 Date and time support.....	4
5.5 Multi-client support.....	4
Annex A (normative) Character set.....	5
Annex B (normative) Parameter definitions.....	9
Annex C (normative) File Server message definitions.....	18
Bibliography	38

[ISO 11783-13:2007](https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007)

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 11783-13 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

ISO 11783 consists of the following parts, under the general title *Tractors and machinery for agriculture and forestry — Serial control and communications data network*:

- *Part 1: General standard for mobile data communication*
- *Part 2: Physical layer*
- *Part 3: Data link layer*
- *Part 4: Network layer*
- *Part 5: Network management*
- *Part 6: Virtual terminal*
- *Part 7: Implement messages application layer*
- *Part 8: Power train messages*
- *Part 9: Tractor ECU*
- *Part 10: Task controller and management information system data interchange*
- *Part 11: Mobile data element dictionary*
- *Part 12: Diagnostics services*
- *Part 13: File server*

Automated functions is to form the subject of a future part 14.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

Introduction

ISO 11783 specifies a communications system for agricultural equipment based on the CAN 2.0 B [1] protocol. SAE J 1939 documents, on which parts of ISO 11783 are based, were developed jointly for use in truck and bus applications and for construction and agriculture applications. Joint documents were completed to allow electronic units that meet the truck and bus SAE J 1939 specifications to be used by agricultural and forestry equipment with minimal changes.

General information on ISO 11783 is to be found in ISO 11783-1. The purpose of ISO 11783 is to provide an open, interconnected system for on-board electronic systems. It is intended to enable electronic control units (ECUs) to communicate with each other, providing a standardized system.

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this part of ISO 11783 may involve the use of a patent concerning the controller area network (CAN) protocol referred to throughout the document.

ISO takes no position concerning the evidence, validity and scope of this patent.

The holder of this patent has assured ISO that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO. Information may be obtained from:

Robert Bosch GmbH
Wernerstrasse 51
Postfach 30 02 20
D-70442 Stuttgart-Feuerbach
Germany

(standards.iteh.ai)

[ISO 11783-13:2007](https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007)

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

Attention is drawn to the possibility that some of the elements of this part of ISO 11783 may be the subject of patent rights other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 11783-13:2007](https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007)

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

Tractors and machinery for agriculture and forestry — Serial control and communications data network —

Part 13: File server

1 Scope

ISO 11783 as a whole specifies a serial data network for control and communications on forestry or agricultural tractors and mounted, semi-mounted, towed or self-propelled implements. Its purpose is to standardize the method and format of transfer of data between sensors, actuators, control elements and information storage and display units, whether mounted on, or part of, the tractor or implement. This part of ISO 11783 describes the file server for use by a tractor or self-propelled implement.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11783-1, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 1: General standard for mobile data communication*¹⁾

ISO 11783-3, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 3: Data link layer*

ISO 11783-6, *Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 6: Virtual terminal*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11783-1 and the following apply.

3.1

directory

file which stores administrative information about other files

3.2

client

electronic control unit (ECU) on the mobile implement bus that uses the services of the file server

3.3

file

data object that stores data on a storage device

1) To be published.

3.4

file attribute

bit-coded information that defines the type and features of a file

3.5

file server

FS

electronic control unit (ECU) on the mobile implement bus that provides storage for files and uses a set of commands for the handling of, and access to, these files

3.6

filename

name conforming to requirements of a character set, which identifies a file or directory

3.7

handle

data object used for accessing files and directories

3.8

“hidden” attribute

file attribute indicating that the file should not appear in a directory listing

NOTE A client sets this attribute by using the file server commands.

3.9

path

specification of a filename that may also include the directory name

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.10

“read-only” attribute

file attribute used to prevent writing to, or deletion of, a file

ISO 11783-13:2007
<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825602/iso-11783-13-2007>

NOTE A client sets this attribute by using the file server commands.

3.11

volume

directory that refers to a specific logical or physical storage unit or space

NOTE The primary volume is the volume used as current volume when the file server is started.

4 General

The message set specified in this part of ISO 11783 is designed to support the needs of tractors and implements in using the services of a file server, a distinct ECU (electronic control unit) on the mobile implement control system that enables all controllers to store or retrieve data from a file-based storage device.

5 Requirements

5.1 General message format

The general message format uses the parameter group number as the label for a group of parameters. Each of the parameters within the group can be expressed as characters, as scaled data defined by the ranges according to 5.2, or as one or more bits. Characters will be transmitted with the left-most character first. Numerical parameters consisting of two or more data bytes shall be transmitted least significant byte first. When variable-length messages have eight or less data bytes, these messages shall be transmitted in a single CAN frame. When a message has less than eight data bytes, the unused bytes shall be filled with FF₁₆ values.

5.2 File data format

5.2.1 Data

Data consists of a block of bytes (unsigned eight-bit values). All values in the range of $0_{10} \dots 255_{10}$, $00_{16} \dots FF_{16}$ are allowed. There is no special handling of individual characters (control characters, end-of-line markers, end-of-file markers or similar characters).

5.2.2 Bit groups

Groups of one to eight bits are packed into one byte as bit 7 ... bit 0. Groups of nine to 16 bits are packed into two bytes in the order of LSB as bit 7 ... bit 0 followed by MSB as bit 15 ... bit 8. Unused bits in a bit group default to a value of 0 (zero).

5.2.3 Integer

Unsigned 8 bit	1 byte	$0 \dots 2^8-1$	$0_{10} \dots 255_{10}$
Unsigned 16 bit	2 bytes, LSB first	$0 \dots 2^{16}-1$	$0_{10} \dots 65535_{10}$
Unsigned 32 bit	4 bytes, LSB first	$0 \dots 2^{32}-1$	$0_{10} \dots 4294967295_{10}$
Signed 32 bit	4 bytes, LSB first, two's compliment	$-2^{31} \dots 2^{31}-1$	$-2147483648_{10} \dots +2147483647_{10}$

5.2.4 Character string

A string contains characters represented by bytes (unsigned eight-bit values). The length of a string is specified by a string length data item. Annex A specifies the characters allowed in a string used as a filename or a path name.

<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

5.3 Data transmission control

5.3.1 General

Each communication transaction between a client and the file server is initiated by a request from the client and terminated by a response from the file server. To provide fail-safe communications, it is important that the client can assign the received response to a corresponding request and repeat an erroneous request without triggering the complete execution again.

5.3.2 Strategy

The client can issue a request and receive no response because of transient communication problems. The failure can happen during the request message, i.e. the file server does not receive the request, or the failure can happen during the response message, i.e. the client does not receive the response. The client cannot distinguish between these two cases and will repeat the request again to obtain the requested data.

If there is no transaction strategy, the problem of the file server not receiving the request will be recovered by the client sending a second request and the file server responding with the requested data. But if the client does not receive the correct response data message and sends a second request, the file server will then send the next data from the file because a data request automatically advances to the next data in the file.

A transaction strategy is therefore required to prevent such errors. This strategy involves the use of a transaction number (TAN). The client generates a TAN for each request sent to the file server. This is done by incrementing the last TAN for the next request. The file server compares each new request with the previous request from the same client. If the TAN is not the same, the request is implemented and the response is sent. If the TAN is the same as the previously received request, the request is not implemented and the previous

response is sent. Thus if the client sends a second request in the case where the file server never received the first request, the file server will receive the TAN for the first time and will implement the request and send the correct data response. If the file server receives a request with the same TAN that it has already received, it does not implement the request, but the previous response is retransmitted.

5.3.3 Timeout

The execution time of all file server commands (the time between request and response) is maintained within reasonable limits. The client shall monitor the time while waiting for a response. The timeouts specified in ISO 11783-3 for transport protocol and ISO 11783-6 for extended transport protocol shall be met for the execution of commands. If a timeout expires, the request is assumed to have failed and the client can repeat the request using the same TAN.

5.4 Date and time support

Several file server commands require a file date and time. UTC is used for this time²⁾. The file server's implementation of real time support may be either by maintaining its own real time information or by requesting the time and date information using the Time/Date parameter group specified in ISO 11783-7. The date and time of a file is the latest date and time when a file was actually modified. A file which is opened for read/write access but is not modified by a write action shall not get a later date and time.

5.5 Multi-client support

The file server shall support one or more clients. If more than one client has a connection simultaneously, the file server shall function with each client as if it is the only one on the network. There shall be no interference between the commands processed for different clients.

Upon connection of a client, the file server initiates the current directory for that client to be the root directory of the file servers file system. The client is required to use the appropriate Change Current Directory or Open File commands to access files that need to be unique for that client. In case multiple clients require access to common files, these clients are responsible for synchronizing their directory and file naming conventions to access these common files. To prevent unintentional access to manufacturer proprietary files a reserved directory name, containing the manufacturer code according to ISO 11783-5, is specified. The naming convention of the manufacturer specific directory is:

MCMC0000

where 0000 contains the four-digit manufacturer code in decimal representation and formatted with leading zeroes. A client shall not use this manufacturer-coded directory name with a manufacturer code different to the manufacturer code in its NAME field. When the client attempts to open a file in a manufacturer-specific directory and the manufacturer code in the NAME of that client is not equal to the manufacturer-specific directory name, the file server shall prevent access and return an "access denied" error code.

When a file servers supports multiple volumes, manufacturer-specific directories can be created on each volume. Creation of a manufacturer-specific directory is the responsibility of the client.

2) UTC: co-ordinated universal time, or universal time, formerly known as Greenwich mean time (GMT).

Annex A
(normative)

Character set

A.1 Valid characters

The file server uses filenames and path names. Every character used for one of the names is validated by the file server using the appropriate subset of Table A.1 and the filename and path definitions given in A.2. For case-insensitive file systems, the lower case characters (61₁₆ to 7A₁₆) are converted to upper case characters (41₁₆ to 5A₁₆). File servers that do not support long filenames shall use an 8.3 name and extension notation where the name is a maximum of eight characters long optionally followed by an extension that starts with single dot (2E₁₆) and finishes with a maximum of three characters. File servers that support long filenames shall use the filename and path defined in A.2.

Table A.1 — ISO Latin 1 character set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘
1	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘
2	space	!	"	#	\$	%	&	()	*	+	,	-	.	/	
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{		}	~	⌘
8	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘
9	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘
A	⌘	ı	ø	£	¤	¥	ı	§	¨	©	«	»	¬	-	®	™
B	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

⌘ non-printable character

NOTE This information is given for reference; the following does not use all the available characters given here.

A.2 Filename and path definitions

A.2.1 General

Definitions:

- [] any of the characters in Table A.1, including none from the set (optional);
- [A-B] defines an inclusive range from the first through the last;
- () group;
- < > character class;
- \ escapes the following character, as in “[\”, which indicates a single left bracket, not the containment of a set;
- A | B sequence “A” or “B”;
- A + B sequence of A followed by B;
- {m} exactly m of the preceding set;
- {m,n} from m to, and including, n of the preceding set;

Sample filenames, both partial and fully qualified:

Test

Test.txt

.test.txt

\test.txt

\path\path\some.file.txt

ITeH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/bfeb34d8-7134-4f6e-8d4f-4d494825fa02/iso-11783-13-2007>

The wildcards “*” and “?” may be used. The “*” is a wildcard for representation of a part of a filename, starting from a path delimiter “\” up to another path delimiter “\” or “.”. The “?” is a wildcard for a single character in a filename. Wildcards shall only be used for directory listings.

The “~” character may be used as a placeholder for the manufacturer-specific directory of a client. This character can only be specified at the beginning of a path and shall be replaced by the file server with the manufacturer-specific directory name on the current volume.

EXAMPLE “~\file1.txt” expands to “\MCMC0000\file1.txt”.

The two predefined special directory names “.” and “..” refer to the current directory (“.”) and the parent directory (“..”). These predefined directory names shall not be reported in a directory listing but may be used in a path name to specify reference to a current or parent directory.

A.2.2 Filename definition

File names are from one to 31 characters in length, using the character set described below. The first character is further restricted from the remaining characters that are allowed:

FileFirstChar ::= [0-9A-Za-z_*?]

FileExtendedChar ::= [!#\$%'+,-.; @~^=\[\]]

FileNameChar ::= [<FileFirstChar> | <FileExtendedChar>]

FileName ::= <FileFirstChar> + [<FileNameChar>]{1, 30}

A.2.3 Volume definition

A volume definition is similar to a filename but is identified by the volume delimiter.

VolumeDelim ::= “\”

VolumeName ::= <VolumeDelim> + <FileName>

A.2.4 Path definition

A path definition is similar to a filename definition but has additional prefix definitions and delimiters between path segments.

PathDelim ::= “\”

PathFirstChar ::= [<FileFirstChar> | (.){1,2} | (\) | (~)]

PathChar ::= <FileNameChar>

PathName ::= [<VolumeName> + <PathDelim> + <PathFirstChar> + [<PathChar>]{0, 30}

When a directory listing from path “\” is requested, the FS shall return a list of volumes.

A.2.5 Fully qualified filename (FQFN)

An FQFN includes as much path information as is needed to produce an unambiguous specification of the path to the file:

FullyQualifiedFileName ::= [<PathName> + [<PathDelim> + <PathName >]]{0, 6} + [<PathDelim> + <FileName>]{1, 31}

The following are *disallowed* in FQFN:

- “&” ampersand;
- “:” colon
- “ ” double quotation marks
- “<” less-than sign
- “>” greater-than sign
- “ ` ” reverse single quotation mark/grave accent
- “{” left curly bracket/left brace
- “}” right curly bracket/right brace
- “|” vertical line/pipe
- “/” slash/forward slash