

ISO 11783-6:2018 (E)

Tractors and machinery for agriculture and forestry — Serial control and communications data network — Part 6: Virtual terminal

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Technical requirements
4.1	Overview
4.1.1	Technical requirements of VT versions
4.2	Operator input and control
4.3	Acoustic alarm
4.4	Coordinate system
4.5	Display areas
4.5.1	General
4.5.2	Data Mask
4.5.3	Soft Key Mask area and Soft Key designators
4.5.3.1	Soft Key variants and navigation
4.5.3.2	Physical Soft Keys
4.5.3.3	Virtual Soft Keys
4.5.3.4	Navigation Soft Keys
4.5.3.5	Navigation among Soft Keys
4.6	Behaviour
4.6.1	Object pools
4.6.1.1	General
4.6.1.2	“NULL” Object ID
4.6.1.3	Processing objects
4.6.2	Working Sets
4.6.3	Multiple visually similar Working Sets
4.6.4	Displayed Working Set number
4.6.5	Language, formats and measurement units selection
4.6.6	Initialization
4.6.6.1	VT initialization
4.6.6.2	Working Set initialization with VT
4.6.6.3	Working Set initialization on networks with multiple VTs
4.6.7	System shutdown
4.6.7.1	General
4.6.7.2	VT behaviour
4.6.7.3	Working Set behaviour
4.6.8	Working Set object and active masks
4.6.9	Connection management
4.6.10	Updating the operator interface
4.6.10.1	General
4.6.10.2	Changing attributes and values
4.6.10.3	Changing, adding and deleting objects
4.6.11	Special objects
4.6.11.1	Container objects
4.6.11.2	Attribute objects
4.6.11.3	Variable objects
4.6.11.4	Macros

- 4.6.11.5 Object pointer
- 4.6.11.6 External Object Pointer
- 4.6.12 Relative X/Y positions
- 4.6.13 Overlaid objects
- 4.6.14 Alarm handling
- 4.6.15 Clipping
- 4.6.16 Scaling
 - 4.6.16.1 General
 - 4.6.16.2 Positions and sizes
 - 4.6.16.3 Fonts
 - 4.6.16.4 Picture graphic objects
- 4.6.17 Operator input
- 4.6.18 Soft Key and Button activation
- 4.6.19 Font rendering
 - 4.6.19.1 General
 - 4.6.19.2 Text justification
 - 4.6.19.2.1 Horizontal left justification
 - 4.6.19.2.2 Horizontal middle justification
 - 4.6.19.2.3 Horizontal right justification
 - 4.6.19.2.4 Vertical top justification
 - 4.6.19.2.5 Vertical middle justification
 - 4.6.19.2.6 Vertical bottom justification
 - 4.6.19.3 Non-proportional fonts
 - 4.6.19.4 Proportional fonts
 - 4.6.19.5 Auto-wrap
 - 4.6.19.6 Non-printing characters in strings
 - 4.6.19.7 String encoding
- 4.6.20 Object Rendering Accuracy, Quality and VT Developer Freedom
- 4.6.21 Line art and filling output shape objects
- 4.6.22 Events
 - 4.6.22.1 General
 - 4.6.22.2 Macro references — VT version 4 and prior
 - 4.6.22.3 Macro references — VT version 5 and later
- 4.6.23 Touch screens and pointing devices
- 4.6.24 Proprietary Means
- 4.6.25 VT Number
- 4.6.26 Packet Padding
- 4.6.27 Momentary or Non-latched Means
- 4.6.28 Unsupported Objects
- 4.6.29 Error codes
- 4.7 Displaying Data from Multiple Working Sets on One Mask
 - 4.7.1 General
 - 4.7.1.1 Displaying Data on one screen
 - 4.7.1.2 Minimal Requirements
 - 4.7.2 User-Layout Data Mask
 - 4.7.3 Window Mask object
 - 4.7.4 Window Mask content
 - 4.7.4.1 Presentations
 - 4.7.4.2 Working Set defined presentation
 - 4.7.4.3 VT defined presentation
 - 4.7.5 Window Cell Size and Borders
 - 4.7.6 Window Mask Scaling
 - 4.7.7 Using Window Masks Outside of User-Layout Data Masks
 - 4.7.8 User-Layout Soft Key Mask
 - 4.7.9 Key Group Objects
 - 4.7.10 Key Cell Size and Borders
 - 4.7.11 Key Group Scaling
 - 4.7.12 Using Key Group Objects outside of User-Layout Soft Key Masks
 - 4.7.13 Operator Inputs
 - 4.7.14 Refreshing On Screen Data
 - 4.7.15 Look and Feel
 - 4.7.15.1 User-Layout Data Mask Look and Feel
 - 4.7.15.2 Window Title and Window Title Font Attributes
 - 4.7.15.3 Window Icon size and shape

- 4.7.15.4 Formatting
- 4.7.16 Uploading New Window Mask and Key Group objects
- 4.8 Colour Controls

Annex A (normative) Object, event, colour and command codes

- A.1 Object types
 - A.1.1 General
 - A.1.2 Nomenclature
 - A.1.3 Object relationships
- A.2 Event types
- A.3 VT standard colour palette
- A.4 Command/parameter code summary

Annex B (normative) Object definitions

- B.1 Working Set object
- B.2 Data Mask object
- B.3 Alarm Mask object
- B.4 Container object
- B.5 Soft Key Mask object
- B.6 Key object
- B.7 Button object
- B.8 Input field objects
 - B.8.1 General
 - B.8.2 Input Boolean object
 - B.8.3 Input String object
 - B.8.4 Input Number object
 - B.8.5 Input List object
- B.9 Output field objects
 - B.9.1 General
 - B.9.2 Output String object
 - B.9.3 Output Number object
 - B.9.4 Output List object
- B.10 Output shape objects
 - B.10.1 General
 - B.10.2 Output Line object
 - B.10.3 Output Rectangle object
 - B.10.4 Output Ellipse object
 - B.10.5 Output Polygon object
- B.11 Output graphic objects
 - B.11.1 General
 - B.11.2 Output Meter object
 - B.11.3 Output Linear Bar Graph object
 - B.11.4 Output Arched Bar Graph object
- B.12 Picture Graphic object
 - B.12.1 General
 - B.12.2 Picture Graphic object raw data format and compression
- B.13 Variable objects
 - B.13.1 General
 - B.13.2 Number Variable object
 - B.13.3 String Variable object
- B.14 Attribute objects
 - B.14.1 General
 - B.14.2 Font Attributes object
 - B.14.3 Line Attributes object
 - B.14.4 Fill Attributes object
 - B.14.5 Input Attributes object
 - B.14.6 Extended Input Attributes object
- B.15 Object Pointer object
- B.16 Macro object
- B.17 Colour Map object
- B.18 Graphics Context object
- B.19 Window Mask object
 - B.19.1 General
 - B.19.2 Window Mask Window Types

- B.19.2.1 Free Form Window Mask (type 0)
- B.19.2.2 1 × 1 Numeric Output Value Window with Units
- B.19.2.3 1 × 1 Numeric Output Value Window, No Units
- B.19.2.4 1 × 1 String Output Value Window
- B.19.2.5 1 × 1 Numeric Input Value Window with Units
- B.19.2.6 1 × 1 Numeric Input Value Window, No Units
- B.19.2.7 1 × 1 String Input Value Window
- B.19.2.8 1 × 1 Horizontal Linear Bargraph Window
- B.19.2.9 1 × 1 Single Button Window
- B.19.2.10 1 × 1 Double Button Window
- B.19.2.11 2 × 1 Numeric Output Value Window with Units
- B.19.2.12 2 × 1 Numeric Output Value Window, No Units
- B.19.2.13 2 × 1 String Output Value Window
- B.19.2.14 2 × 1 Numeric Input Value Window with Units
- B.19.2.15 2 × 1 Numeric Input Value Window, No Units
- B.19.2.16 2 × 1 String Input Value Window
- B.19.2.17 2 × 1 Horizontal Linear Bargraph Window
- B.19.2.18 2 × 1 Single Button Window
- B.19.2.19 2 × 1 Double Button Window
- B.20 Key Group object
- B.21 Object Label Reference List object
- B.22 External Object Definition object
- B.23 External Reference NAME object
- B.24 External Object Pointer object
- B.25 Animation object
- B.26 Colour Palette object
- B.27 Graphic Data object
- B.28 Scaled Graphic object
- B.29 Working Set Special Controls object

Annex C (normative) Object transport protocol

- C.1 Virtual terminal messages and object transfer
- C.2 Building object pools
 - C.2.1 General
 - C.2.2 Object pool transfer procedure
 - C.2.3 Object pool transfer message
 - C.2.4 End of Object Pool message
 - C.2.5 End of Object Pool response
 - C.2.6 Updating pools at runtime

Annex D (normative) Technical data messages

- D.1 General
- D.2 Get Memory message
- D.3 Get Memory response
- D.4 Get Number of Soft Keys message
- D.5 Get Number of Soft Keys response
- D.6 Get Text Font Data message
- D.7 Get Text Font Data response
- D.8 Get Hardware message
- D.9 Get Hardware response
- D.10 Get Supported Widechars message
- D.11 Get Supported WideChars response
- D.12 Get Window Mask Data message
- D.13 Get Window Mask Data response
- D.14 Get Supported Objects message
- D.15 Get Supported Objects response
- D.16 Screen Capture command
- D.17 Screen Capture response
- D.18 Identify VT message
- D.19 Identify VT response

Annex E (normative) Non-volatile memory operations commands

- E.1 General
 - E.1.1 Introduction

E.1.2	Version Management — VT version 4 and prior
E.1.3	Version Management — VT version 5 and later
E.2	Get Versions message
E.3	Get Versions response
E.4	Store Version command
E.5	Store Version response
E.6	Load Version command
E.7	Load Version response
E.8	Delete Version command
E.9	Delete Version response
E.10	Extended Get Versions message
E.11	Extended Get Versions response
E.12	Extended Store Version command
E.13	Extended Store Version response
E.14	Extended Load Version command
E.15	Extended Load Version response
E.16	Extended Delete Version command
E.17	Extended Delete Version response

Annex F (normative) Command and Macro messages

F.1	General
F.2	Hide/Show Object command
F.3	Hide/Show Object response
F.4	Enable/Disable Object command
F.5	Enable/Disable Object response
F.6	Select Input Object command
F.7	Select Input Object response
F.8	ESC command
F.9	ESC response
F.10	Control Audio Signal command
F.11	Control Audio Signal response
F.12	Set Audio Volume command
F.13	Set Audio Volume response
F.14	Change Child Location command
F.15	Change Child Location response
F.16	Change Child Position command
F.17	Change Child Position response
F.18	Change Size command
F.19	Change Size response
F.20	Change Background Colour command
F.21	Change Background Colour response
F.22	Change Numeric Value command
F.23	Change Numeric Value response
F.24	Change String Value command
F.25	Change String Value response
F.26	Change End Point command
F.27	Change End Point response
F.28	Change Font Attributes command
F.29	Change Font Attributes response
F.30	Change Line Attributes command
F.31	Change Line Attributes response
F.32	Change Fill Attributes command
F.33	Change Fill Attributes response
F.34	Change Active Mask command
F.35	Change Active Mask response
F.36	Change Soft Key Mask command
F.37	Change Soft Key Mask response
F.38	Change Attribute command
F.39	Change Attribute response
F.40	Change Priority command
F.41	Change Priority response
F.42	Change List Item command
F.43	Change List Item response
F.44	Delete Object Pool command

F.45	Delete Object Pool response
F.46	Lock/Unlock Mask command
F.47	Lock/Unlock Mask response
F.48	Execute Macro command
F.49	Execute Macro response
F.50	Change Object Label command
F.51	Change Object Label response
F.52	Change Polygon Point command
F.53	Change Polygon Point response
F.54	Change Polygon Scale command
F.55	Change Polygon Scale response
F.56	Graphics Context command
F.57	Graphics Context response
F.58	Get Attribute Value message
F.59	Get Attribute Value response
F.60	Select Colour Map or Palette command
F.61	Select Colour Map or Palette response
F.62	Execute Extended Macro command
F.63	Execute Extended Macro response
F.64	Select Active Working Set command
F.65	Select Active Working Set response

Annex G (normative) Status Messages

G.1	General
G.2	VT Status message
G.3	Working Set Maintenance message
G.4	Unsupported VT Function message
G.5	VT Unsupported VT Function message

Annex H (normative) Activation messages

H.1	General
H.2	Soft Key Activation message
H.3	Soft Key Activation response
H.4	Button Activation message
H.5	Button Activation response
H.6	Pointing Event message
H.7	Pointing Event response
H.8	VT Select Input Object message
H.9	VT Select Input Object response
H.10	VT ESC message
H.11	VT ESC response
H.12	VT Change Numeric Value message
H.13	VT Change Numeric Value response
H.14	VT Change Active Mask message
H.15	VT Change Active Mask response
H.16	VT Change Soft Key Mask message
H.17	VT Change Soft Key Mask response
H.18	VT Change String Value message
H.19	VT Change String Value response
H.20	VT On User-Layout Hide/Show message
H.21	VT On User-Layout Hide/Show response
H.22	VT Control Audio Signal Termination message
H.23	VT Control Audio Signal Termination response

Annex I (normative) Other messages

Annex J (normative) Auxiliary control

J.1	General
J.2	Auxiliary Inputs
J.3	Auxiliary controls in multiple VT environments
J.3.1	General rules
J.3.2	Primary VT and resolving VT function instance zero
J.4	Defining auxiliary inputs and functions
J.4.1	General

- J.4.2 Auxiliary Function Type 1 object
- J.4.3 Auxiliary Function Type 2 object
- J.4.4 Auxiliary Input Type 1 object
- J.4.5 Auxiliary Input Type 2 object
- J.4.6 Auxiliary Function Type 2 types
- J.4.7 Auxiliary Control Designator Type 2 Object Pointer
 - J.4.7.1 Behaviour
 - J.4.7.2 Pointer type 0, 2
 - J.4.7.3 Other Pointer type references
 - J.4.7.3.1 Pointer type 1, 3
 - J.4.7.3.2 VT function instance > 0
 - J.4.7.3.3 No assigned object
 - J.4.7.3.4 Single assigned object
 - J.4.7.3.5 Multiple assigned objects
- J.5 Automatic Auxiliary Control assignment
- J.6 Manual Auxiliary Control assignment
- J.7 Auxiliary control messages
 - J.7.1 General
 - J.7.2 Auxiliary Assignment Type 1 command
 - J.7.3 Auxiliary Assignment Type 1 response
 - J.7.4 Auxiliary Input Type 1 status
 - J.7.5 Auxiliary Assignment Type 2 command
 - J.7.6 Auxiliary Assignment Type 2 response
 - J.7.7 Preferred Assignment command
 - J.7.8 Preferred Assignment response
 - J.7.9 Auxiliary Input Type 2 Status message
 - J.7.10 Auxiliary Input Type 2 Maintenance message
 - J.7.11 Auxiliary Input Status Type 2 Enable command
 - J.7.12 Auxiliary Input Status Type 2 Enable response
 - J.7.13 Auxiliary Capabilities request
 - J.7.14 Auxiliary Capabilities response
- J.8 Learn Mode

Annex K (normative) Character sets