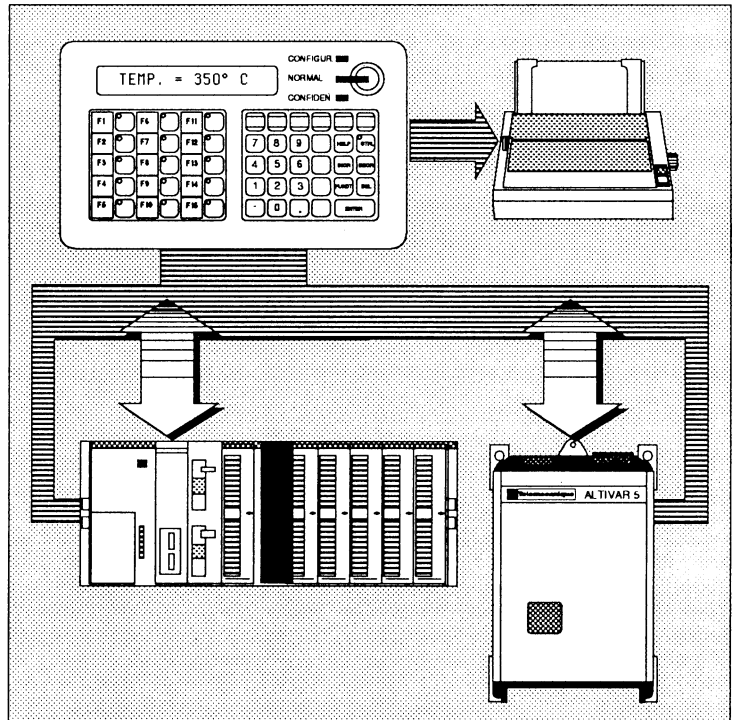




XBT-B/C Terminals

ASCII; REGLAGE; UNI-TE[®] protocols

User's Guide
1990



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- **Operator dialog:**

The productivity requirements that apply to production machinery and the automated systems that control them require greater complexity in control systems.

However, the requirement for simple and explicit exchanges of information with the operator remains. Operator control requires simple two-way dialog in the user's own language.

XBT-B... and XBT-C... terminals are designed for:

USER-FRIENDLY OPERATOR DIALOG

- **DISPLAY** of information in the operator's own language (e.g. parameters, instructions, messages.),
- **COMMANDS** sent by user defined function keys,
- **ENTRY** of values through the numerical key pad,
- **SELECTION** of operating modes.

OPERATION IN INDUSTRIAL ENVIRONMENTS

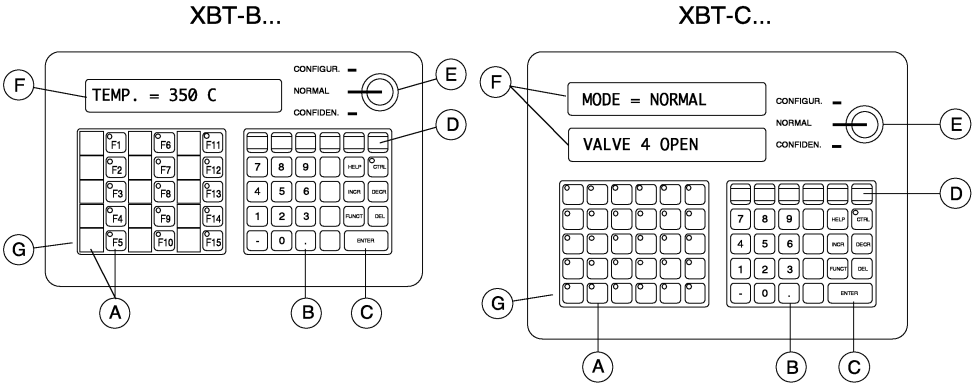
- **PROTECTED:** front panel meets IP65 standards,
- **READABLE:** green fluorescent alphanumeric character display, 10 mm high characters that can be read from a distance of 4 meters,
- **COMFORTABLE:** tactile feedback keyboard for data entry,
- **SAFE:** isolated serial links, built-in self-tests - unpluggable under power,
- **CUSTOMIZABLE:** all function keys have built-in label holders for customizing for the application.

COMBINABLE WITH VARIOUS AUTOMATION SYSTEMS

- Asynchronous serial link communication data exchange protocols:
ASCII mode for exchanges with all programmable automation systems,
Adjust Mode or UNI-TE protocol for direct exchange with local
TSX Series 7 PLC via UNI-TELWAY bus or remote PLCs via TELWAY 7.
The supported data links are:
 - . Point-to-point (RS-232C, 20 mA Current Loop, RS-422/485),
 - . Multipoint (20 mA Current Loop and RS-422/485).

2.1 General

• Front Panel



- (A) Function keys with label holder and LED indicator
- (B) Numerical keys
- (C) Edit keys
- (D) Indicators
- (E) Operating mode selection keyswitch
- (F) Display
- (G) Black coated 3 mm thick steel front panel (rear cover in ABS plastic)

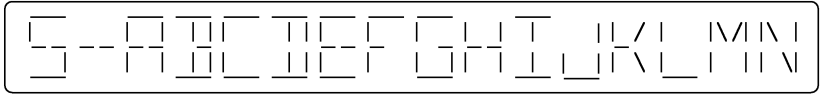
General

• Display

The XBT terminals have 14 segment plus decimal point green fluorescent displays that can display 16 characters that are 10 mm high and 6.4 mm wide.

The XBT-B8... terminal has a single display.

The XBT-C8... terminal has two displays.



• Keyboard

(A) Function key with label holder and LED:

- Function key zone for function keys and label holder. There are two types of function key:



with built-in label holder on the key (30-key function key pad) on XBT-C... terminals,



with label holder next to the key (15-key function key pad) on XBT-B... terminals.

All function keys are fitted with a LED indicator. The label holders provided for the function keys are used to customize the XBT terminal to the application.

(B) Numerical keys:

- A 12-key zone of numerical keys that are used for operator responses:

- keys to and are used for numerical entries,

- the key toggles the sign between + and -.

General Keyboard

C Edit keys:

HELP	<p>In ASCII protocol operation, this key sends the code ESC C 001 LF CR on the line. In Adjust protocol, it can be used to set parameters (as function key 00).</p> <p>In operation, the use of this key is left up to the application program.</p>
CTRL	<p>Only valid in Confidential mode, this key selects and quits Additional Functions mode.</p> <p>This key is fitted with a LED that lights when the user selects Additional Functions.</p>
INCR DECR	<p>In operation, these keys will increment and decrement a value.</p> <p>In Configuration or Confidential modes, these keys will trigger an operation or change a parameter.</p>
FUNCT	<p>In operation, this key enables entry of an indirect access function code.</p> <p>In Configuration mode, this key toggles between XBT functions.</p> <p>In Confidential mode, this key toggles between Additional Functions.</p>
DEL	<p>Clears the last figure entered in a numerical value enabling another value to be entered.</p>
ENTER	<p>In operation, enables validation of a numerical response or acknowledgement of a fault.</p> <p>In Configuration mode, enables selection of the displayed function,</p> <p>In Confidential mode, enables validation of a value entered or moves to the next step.</p>

**General
Keyboard**

D Indicators:

- A zone with six indicators with label holders.

There are two types of indicators:

- 3 are user programmable (1-2-3),
- 3 are terminal status indicators (4-5-6).



Indicator 4 shows that the XBT terminal has been addressed in multipoint mode.

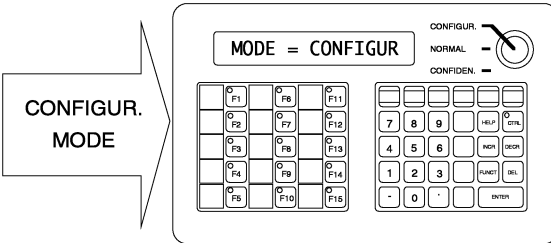
Indicator 5 indicates that one or more fault messages are waiting in the buffer memory (4 messages max.).

Indicator 6 indicates that an operator response is expected.

General

• Operating mode selection

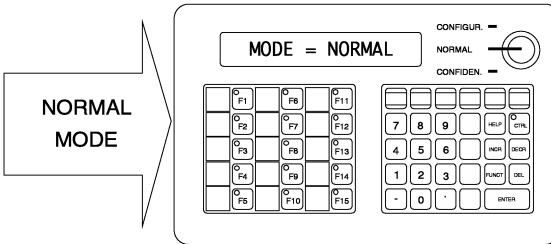
The functions shown on a shaded background are those supported by XBT-B8141 and XBT-C8251 terminals with a connected printer.



This mode is only used for:

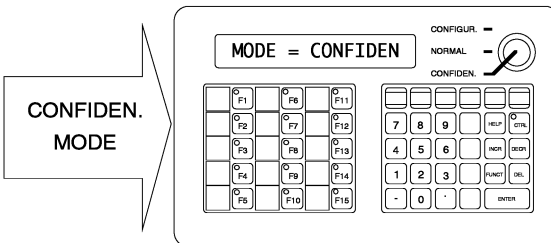
- serial link line transmission configuration,
- storing messages.

- printer line configuration,
- message language selection.



This is the mode used by the operator. The key can only be removed in this position.

- Automatic printing of a continuous log,
- Triggered printing,
- User transparent printing.



This mode is a superset of the Normal mode.

It enables access to messages locked-out by access key.

It permits access to the additional functions:

- reading the message memory self-tests
- setting the real-time clock (XBT-C... only)

- Printing a log,
- Printing recipes,
- Printing messages.

General

- **Message Memory:**

XBT-B...* and XBT-C...* terminals have a non-volatile RAM memory of 150 messages of 16 alphanumeric characters each.

Storing the messages in the memory of the XBT reduces the amount of data stored in the memory of the PLC and reduces the data exchanges required on the serial link.

These messages can be, for example:

- operator requests,
- system requests,
- instructions,
- faults.

START BELT
VALUE = 435
CHECK VOLTAGE
FAULT PUMP 4

Messages can be stored using:

- a PC-PS/2 computer and XBT-L100 program. Applications (messages) can be set-up in Local mode, then transferred to the XBT terminal at any time. XBT-L100 saves the messages to disk and enables them to be printed. In addition, an application in an XBT terminal in operation can be copied to a PC-PS/2, saved, and duplicated to another terminal that can be:
 - A standard display terminal,
 - A TSX T407 programming terminal.



XBT-B8141 AND XBT-C8251 TERMINALS ARE FITTED WITH AN EEPROM (NON-VOLATILE) MEMORY ENABLING STORAGE OF UP TO 250 MESSAGES OF 16 ALPHANUMERIC CHARACTERS EACH.

THE PROCEDURE FOR STORING MESSAGES IS DESCRIBED IN SECTION 5 OF THIS MANUAL.

2.2 Operator Dialog Concept

To control complex automated installations, powerful operator dialog systems must be made available to display plain language information for the operator on rugged operator dialog terminals.

The performance of these systems must be obtained with minimum application program requirements.

The distributed intelligence of XBTs industrial terminals ensures that these objectives are met through:

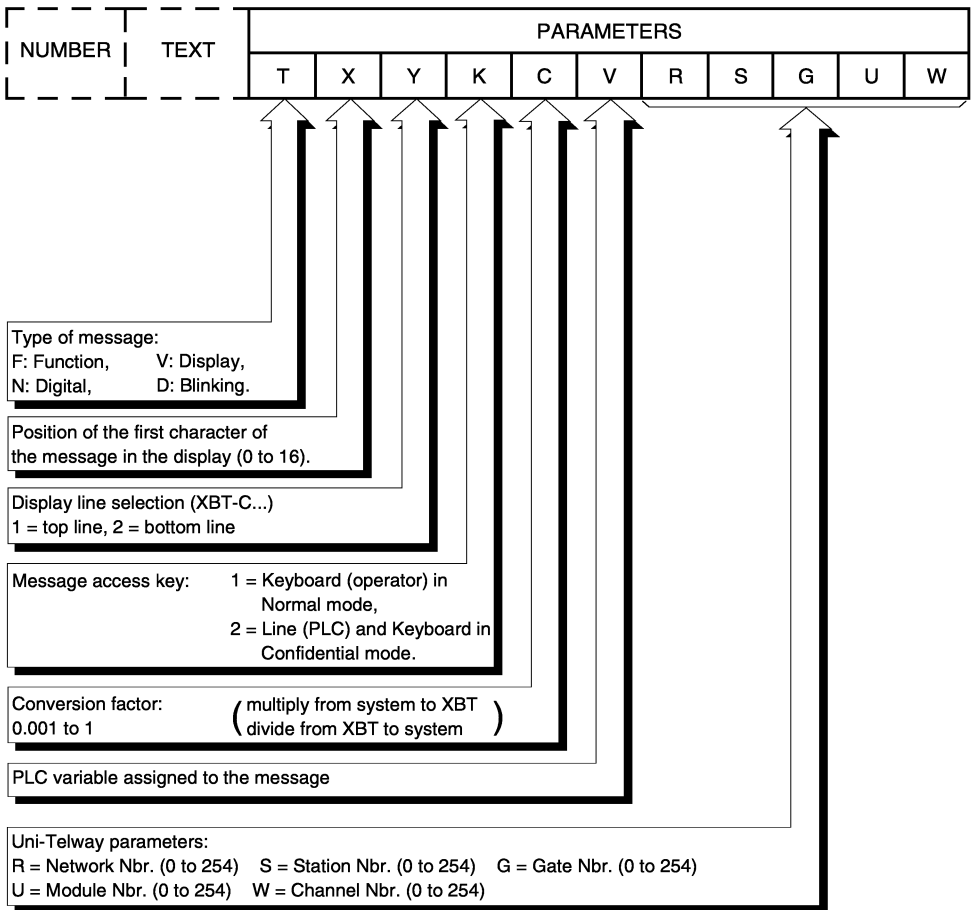
- **The message memory:**

- organization

MESSAGE		TEXT + PARAMETERS	ASCII MODE	TSX7 ADJUST MODE or UNI-TELWAY PROTOCOL
NUMBER				
XBT-B	XBT-C			
000 to 015	000 to 030		OPERATOR INITIATIVE: THERE IS NO ASSIGNMENT OF THE MESSAGE NUMBER TO THE CORRESPONDING KEY	OPERATOR INITIATED: DIRECT ACCESS TO THE MESSAGE NUMBER BY PRESSING THE CORRESPONDING KEY OR PLC INITIATED
016 to 099	031 to 099		DIRECT OR INDIRECT ACCESS AT THE	OPERATOR INITIATED: INDIRECT ACCESS TO THE MESSAGE VIA (FUNCT) + (X) + (X) + (ENTER) OR PLC INITIATED ACCESS
100 to 150	100 to 150		OPERATOR'S INITIATIVE	PLC INITIATED ACCESS
249	249			

**Operator Dialog Concept
Message Memory**

- The message number locates the message in the memory space,
- The text expresses what will be displayed by the terminal,
- The message parameters define the type of dialog that is obtained using the message.



Operator Dialog Concept Message Memory

TYPE	TSX SERIES 7 VARIABLE	DESCRIPTION
F (FUNCTION)	DIGITAL BITS OR WORDS	Write a bit and display a message when a function key is pressed (Adjust Mode), Enter a key number.
N (NUMERICAL)	DIGITAL BITS OR NUMERICAL (WORDS, PRESET, etc .)	An operator response is awaited before entering a numerical value that is sent to the PLC by pressing <input type="button" value="ENTER"/>
V (DISPLAY)	DIGITAL BITS OR NUMERICAL (WORDS, PRESET, etc .)	Displays the message text (with or without a variable or numerical value). No operator response is expected.
D (BLINKING)	DIGITAL BIT	Blinking display of the message text (with or without a variable or numerical value). An operator response is required, press <input type="button" value="ENTER"/> (acknowledgement)

Operator Dialog Concept

• **Commands and Transmissions:**

Are assigned to the messages stored in the memory. They enable all types of dialog between the operator and the PLC.

command = ESC (Escape) request sent to the XBT terminal,
transmission = response to a command or operator input.

Dialog examples:

PURPOSE	STORED MESSAGE	XBT TRANSMISSION	PLC COMMANDS
OPERATOR REQUEST TO START A MOTOR	005 START MOTOR TF VB015	Adjust or Uni-TE Mode = user transparent exchange (write bit 015 and display the text) by pressing the 5 key.	
	005 START MOTOR TV	ASCII MODE PRESS 9	ESC C091 LF CR PLC processing and display message 005 ESC V005 LF CR
OPERATOR REQUEST TO MODIFY A PARAMETER	010 VALUE = - - - - - TN VW50	Adjust or Uni-TE Mode = user transparent exchanges • display the text with the value of word W50 by pressing the 10 key, • send the response by pressing ENTER	
	010 VALUE = - - - - - TN	ASCII MODE PRESS 1	ESC C011 LF CR PLC request to display message 010 and a value of 57354 (blinking). An operator response is expected. ESC R01057354 LF CR The operator changes the value: transmission is started by ENTER ESC R5740 LF CR
PLC REQUEST TO DISPLAY A VALUE	063 TIME = - - - - STV	ESC V063545 LF CR	PLC request to display message 063 with a value of 545.
PLC REQUEST TO DISPLAY A FAULT	083 FAULT VALVE TD	ESC V083 LF CR	PLC request to display message 083.

3.1 Environment Characteristics

Protection level	Meets IEC 529 and NFC 20010: IP 65 (front panel with seal)
External temperature	Operating: 0° C to +50° C Storage: - 25°C to + 70°C
Humidity	0 to 95% no condensation
Impact resistance	Meets IEC 68-2-27 (50 g. 1/2 sine for 11ms)
Vibration resistance	Meets IEC 68-2-6 2mm from 2 to 25 Hz, @ 2.5 g maxi 150 µm from 25 to 150 Hz, @ 1.0 g maxi
Electric disturbances	Immunity meets IEC 65.801.4 level 2

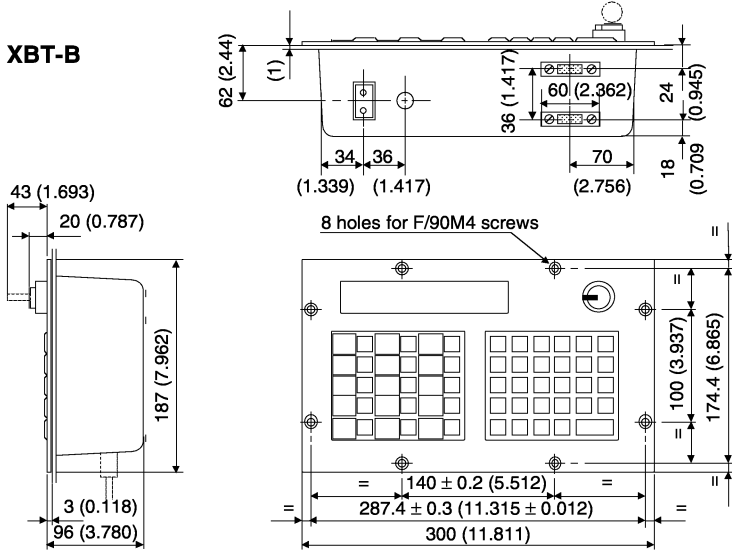
3.2 Mechanical Characteristics

Mounting	Mode: flush mounting, attached by 8 screws with a seal around the terminal. Max. thickness of the mounting console is 10 mm (0.390 inche).
Case	3 mm thick coated black steel front panel (rear cover in ABS plastic)
Connections	<ul style="list-style-type: none"> • Power cord: 2 pin + ground IEC / EEC standard power plug, • Serial link: 25-pin female Sub-D connector, type, HE 50 NFC 93425, • Printer link: 25-pin male Sub-D connector, type, HE 50 NFC 93425.
Weight	XBT-B7/B8 2.6 kg XBT-C7/C8 3.1 kg XBT-B8141 2.9 kg XBT-C8251 3.5 kg

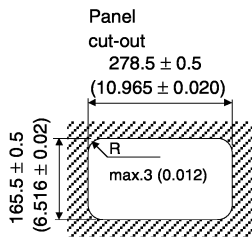
3 Technical Characteristics

Mechanical Characteristics

• XBT-B Dimensions in mm (inches) :

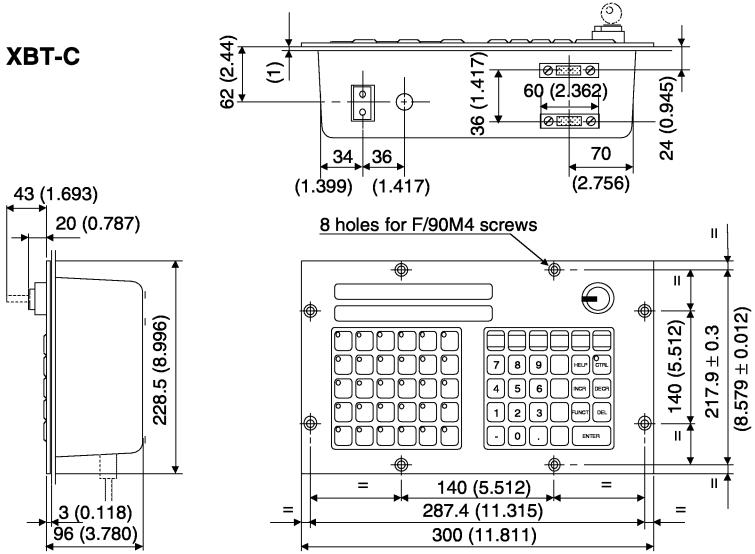


(1) Max. panel thickness is 10 mm (0.390).

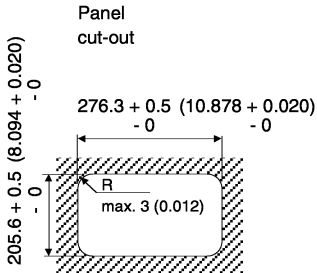


Mechanical Characteristics

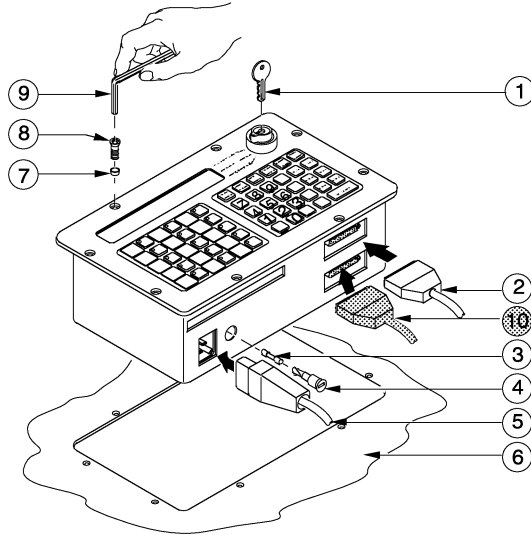
• XBT-C Dimensions in mm (inches):



(1) Max. panel thickness is 10 mm (0.390).



3.3 Mounting



- ① Key for keyswitch
- ② Cable and 25-pin Sub-D male transmission connector
- ③ Delayed action protection fuse, 5 x 20: 315 mA, 230 VAC
or : 630 mA, 115 VAC
- ④ Fuse holder
- ⑤ Mains cord (2 pin + ground)
- ⑥ Panel cut-out for flush mounting
- ⑦ Sealing washers
- ⑧ F/90 M4 mounting screws
- ⑨ Allen wrench for mounting screws
- ⑩ Cable and 25-pin Sub-D female transmission connector
(Printer connection on XBT-B8141 and XBT-C8251)

3.4 Electrical Characteristics

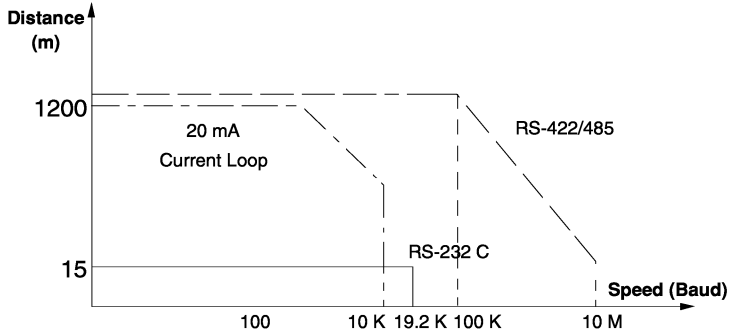
Mains supply	115 VAC model	} +10% -15%
	230 VAC model	
	Line frequency	46 to 64 Hz
	Max. consumption	25 VA

Displays	Capacity : 1 or 2 lines of 16 digits,
	Type : 14 segment (with decimal point) fluorescent,
	Digit size : height = 10 mm (0.38"), width = 6.4 mm (0.25").
	Color : green

Serial links in operation

General The choice of transmission type depends on the required distance and speed.

Selecting the type of serial link



MAXIMUM TRANSMISSION SPEED IS 19200 BAUD USING RS-232C and RS-422 AND 9600 BAUD USING A 20mA CURRENT LOOP

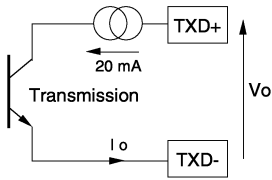
USE ONLY ONE TYPE OF LINK AT ONE TIME

NON-ISOLATED RS-232C ELECTRICAL CHARACTERISTICS MEET INDUSTRY STANDARDS

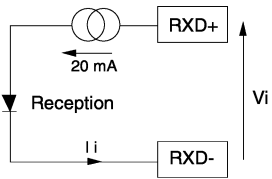
Electrical Characteristics
Serial Links

**20 mA CURRENT LOOP: ELECTRICAL CHARACTERISTICS:
OPTICALLY ISOLATED**

ACTIVE	The terminal provides the power supply to the current loop.
PASSIVE	An external power supply provides the current ($U_{max} = 24 V$).
PASSING	Current flows at rest (MARK)
BLOCKED	Current does not flow at rest (MARK)



Transmission	PROTECTED (with current limiting)
Current I_o	$20 mA \pm 20 \%$
Voltage drop V_o	4 V Max.



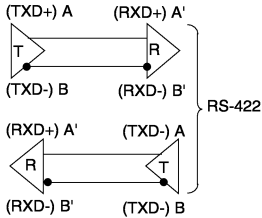
Reception	PROTECTED (with current limiting)
Current I_i	$20 mA \pm 20 \%$
Voltage drop V_i	4 V Max.

Electrical Characteristics

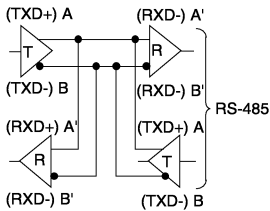
Serial Links

OPTICALLY ISOLATED RS 422/485

ELECTRICAL CHARACTERISTICS: MEET
RS-422 AND RS-485 STANDARDS.



RS-422 Data Link: "4-wire", differential mode connection.



RS-485 Data Link: "2-wire", differential mode connection.

• Printer data link (XBT-B8141 and XBT-C8251):

• RS-232C Serial link

ELECTRICAL CHARACTERISTICS MEET STANDARDS.

• Parallel link

Signal level: high level: 2.4 to 5VDC,
low level : 0.0 to 0.8VDC.

Electrical Characteristics

- **Message memory autonomy**

The XBTs terminals provide a battery backed-up message memory and real-time clock settings (XBT-C... terminal only).

ON DELIVERY, WE RECOMMEND THAT THE TERMINAL REMAIN UNDER POWER FOR AT LEAST 16 HOURS TO CHARGE THE BATTERIES BEFORE STORING APPLICATION MESSAGES.

Once the battery is fully charged, its autonomy is 30 days in the normal operating temperature range (from - 25° C to + 70° C).

Battery characteristics: U = 2.4 VDC, 100 mA/h.

XBT-B8141 and XBT-C8251 TERMINALS HAVE A NON-VOLATILE EEPROM MESSAGE MEMORY.

NOTE:

IN XBT-B8141 TERMINALS, THE TRENDING RAM IS NOT BATTERY BACKED-UP.

- **XBT-C... Relay characteristics**

A single normally open contact

Operating limits:

1 mA min. at 5 VDC,

0.5 A max. at 24 VDC.

Connection: Refer to sub-section 8.1.1, Serial Connector Pin Arrangement.

- **Mains fuse characteristics** (fuse size 5 x 20 mm)

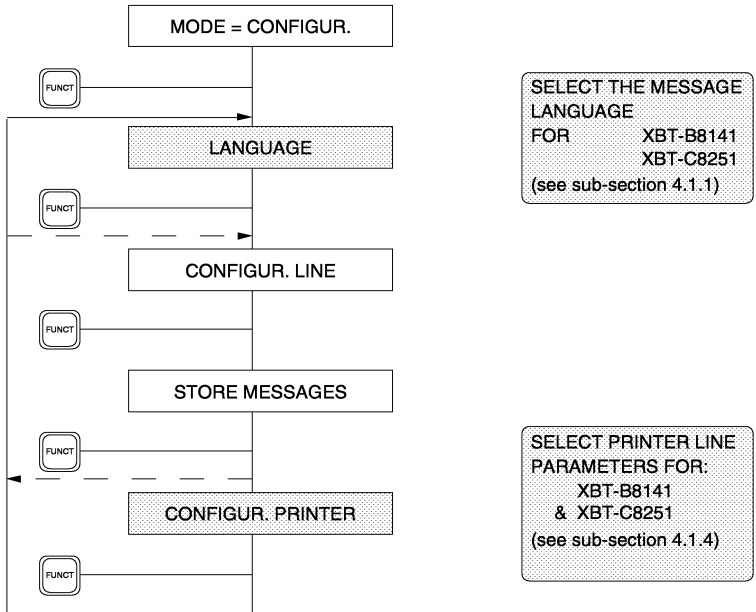
115 VAC supply: 630 mA delayed action,

230 VAC supply: 315 mA delayed action.

4.1 Configuration Mode

This mode is used when installing XBTs to set the parameters required for operation.

Configuration mode menu



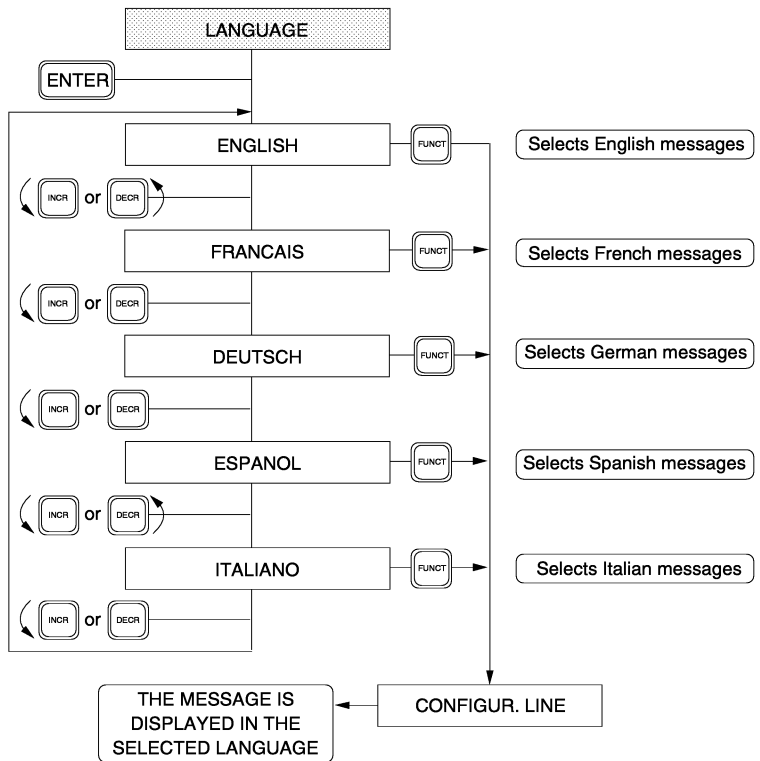
4 Operating Modes

Configuration Mode

4.1.1 Language Configuration

APPLIES TO XBT-B8141 AND XBT-C8251 TERMINALS.

WHEN XBT-B8141 AND XBT-C8251 TERMINALS ARE FIRST POWERED-UP, ALL MESSAGES ARE DISPLAYED IN ENGLISH.



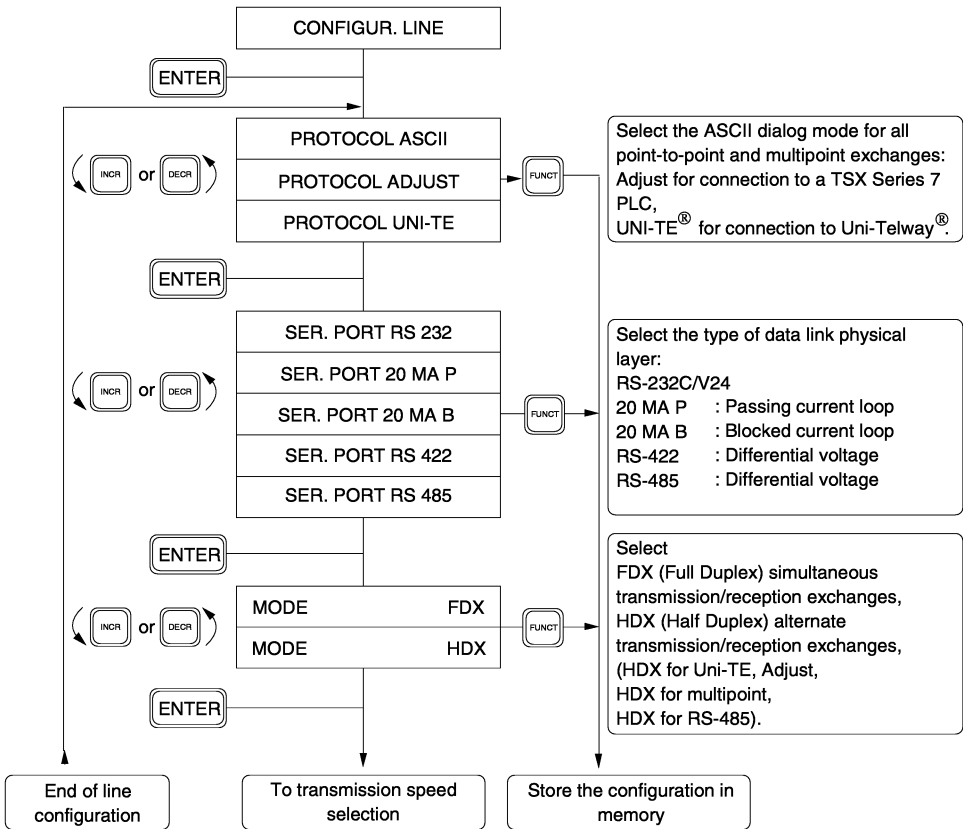
4 Operating Modes

Configuration Mode

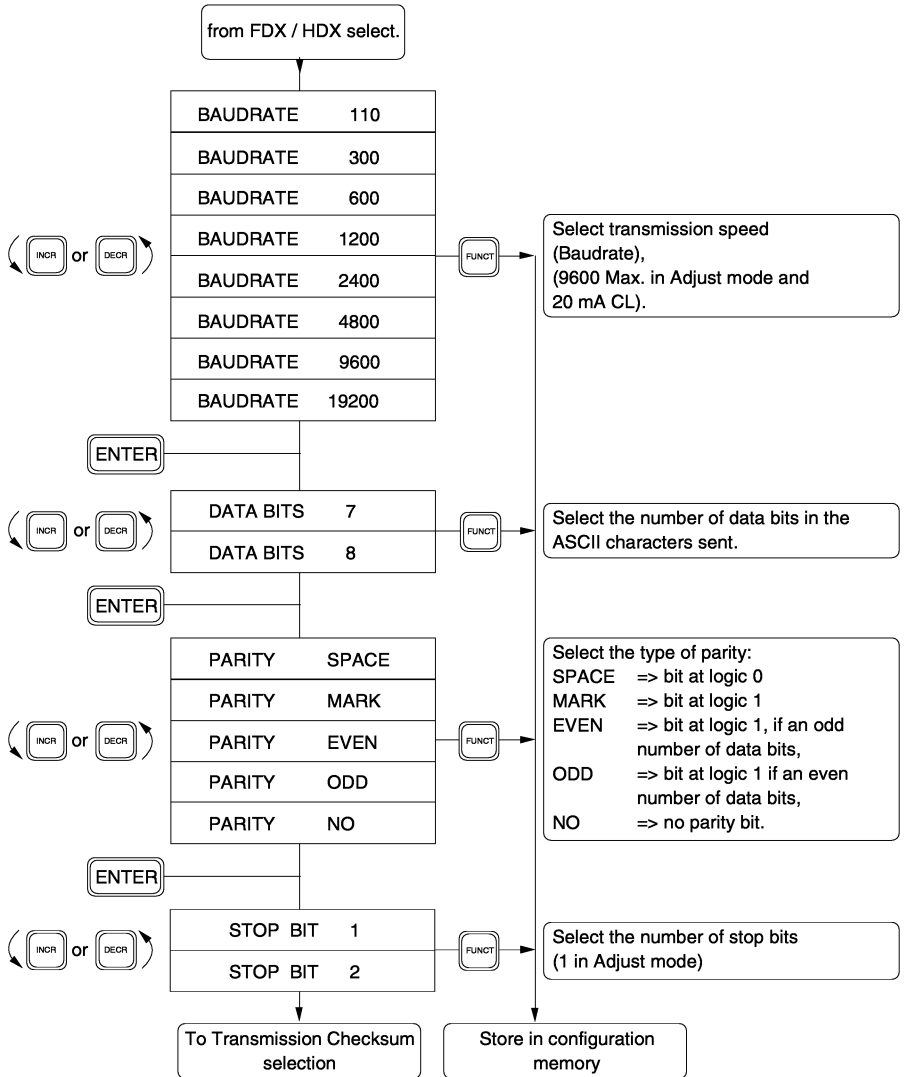
4.1.2 Serial Link Configuration

This procedure sets the transmission line parameters for compatibility with the automated system.

Accessing the mode:

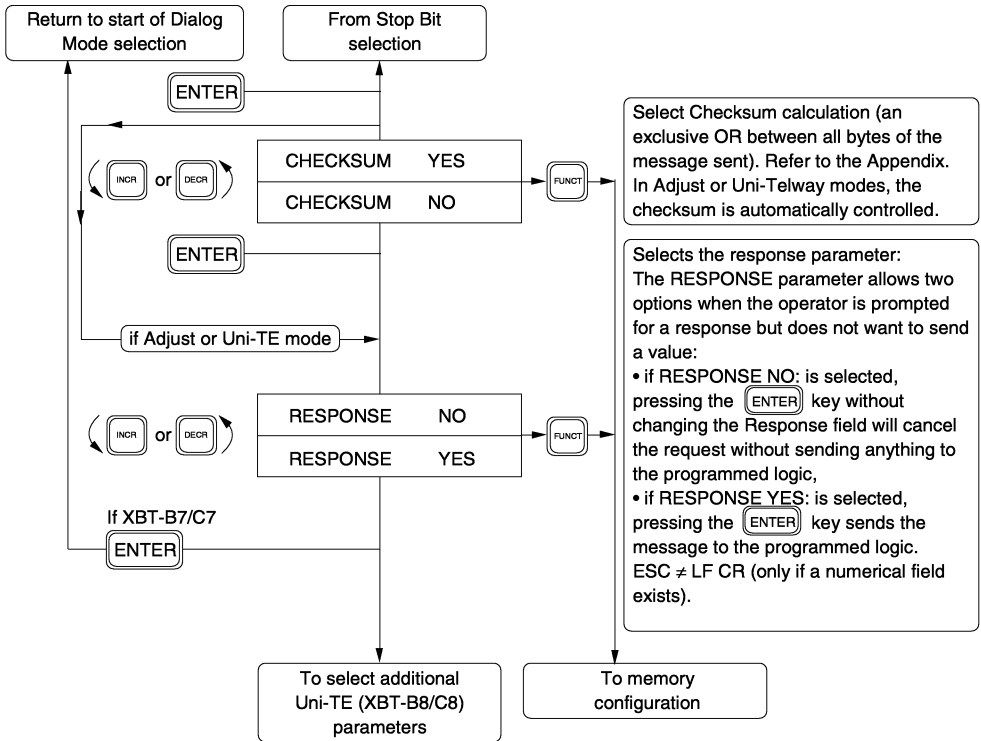


Configuration Mode Serial Link Configuration



NOTE: 7 DATA BITS, NO PARITY, 1 STOP BIT IS NOT ALLOWED.

Configuration Mode Serial Link Configuration



- IN ADJUST MODE, PARAMETER SELECTION IS RESTRICTED TO THE PHYSICAL LAYER (RS-232C / PASSING CL / RS-485) AND TO THE RESPONSE PARAMETER (YES/NO).

• Adjust mode default configuration

The following parameters are fixed:

HALF-DUPLEX (HDX) EXCHANGE
 SPEED 9600 BAUD
 8 DATA BIT FORMAT
 ODD PARITY
 1 STOP BIT
 NO CHECKSUM.

4 Operating Modes

Configuration Mode Serial Link Configuration

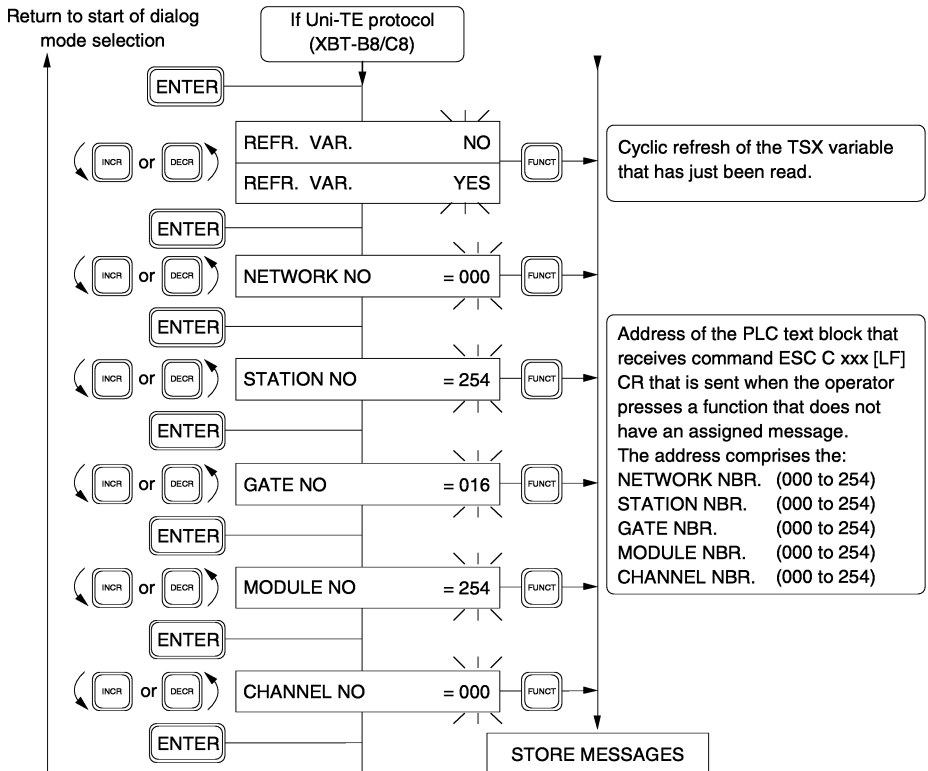
- IN Uni-Telway mode, the following parameters are fixed:
- physical layer : RS-485,
- exchange mode : Half-Duplex,
- format : 8-bits.

• The Uni-Telway configuration default parameters are:

SPEED 9600
FORMAT 8 DATA BITS
STOP 1 STOP BIT
PARITY ODD

For specific network configurations, the Speed, Parity and Stop bit parameters can be changed in the Line Configuration set-up procedure.

Definition of additional Uni-TE protocol parameters



Configuration Mode

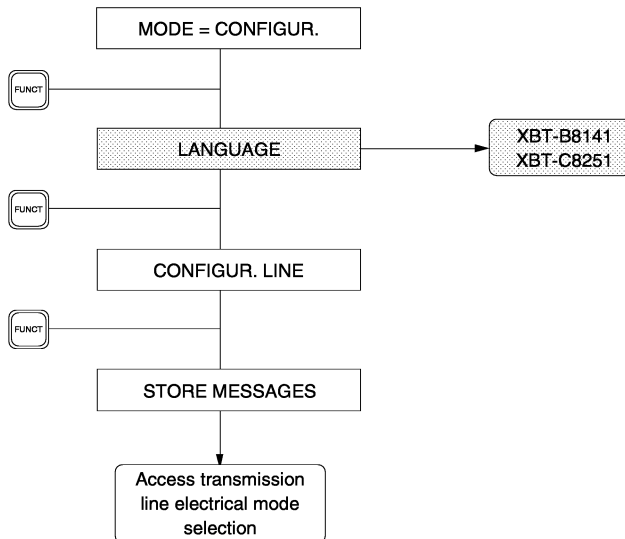
4.1.3 Memory Configuration

Operating messages can be stored in XBTs using various programming terminals (TSX T407, Display terminals, PC-PS/2). The line characteristics of the terminal connection can be different from that of the data link with the PLC.

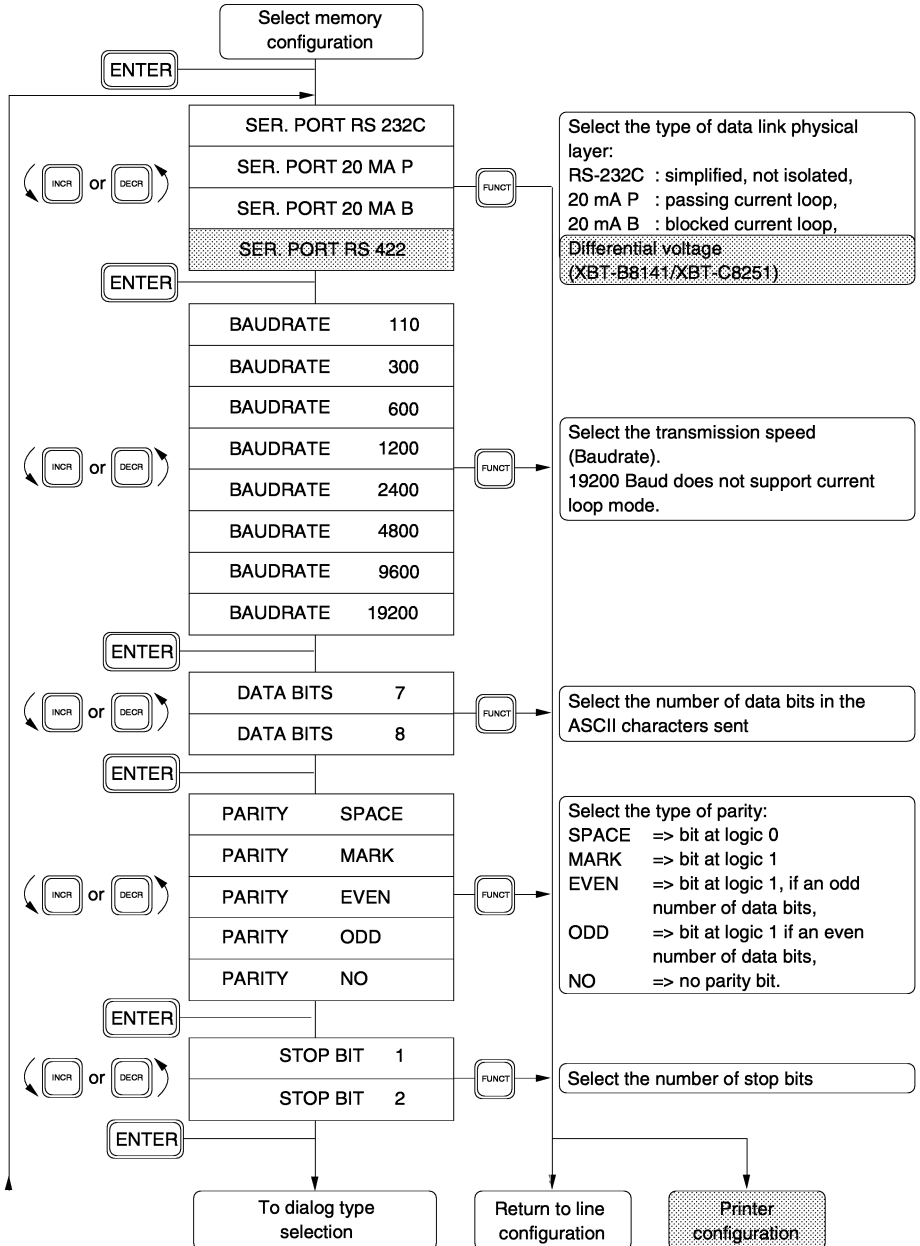
The memory configuration function can be used to change the serial line characteristics on the XBT terminal separately from those required for use with the PLC.

THE SERIAL LINK PARAMETERS USED FOR STORING MESSAGES ARE STORED IF A POWER BREAK OCCURS.

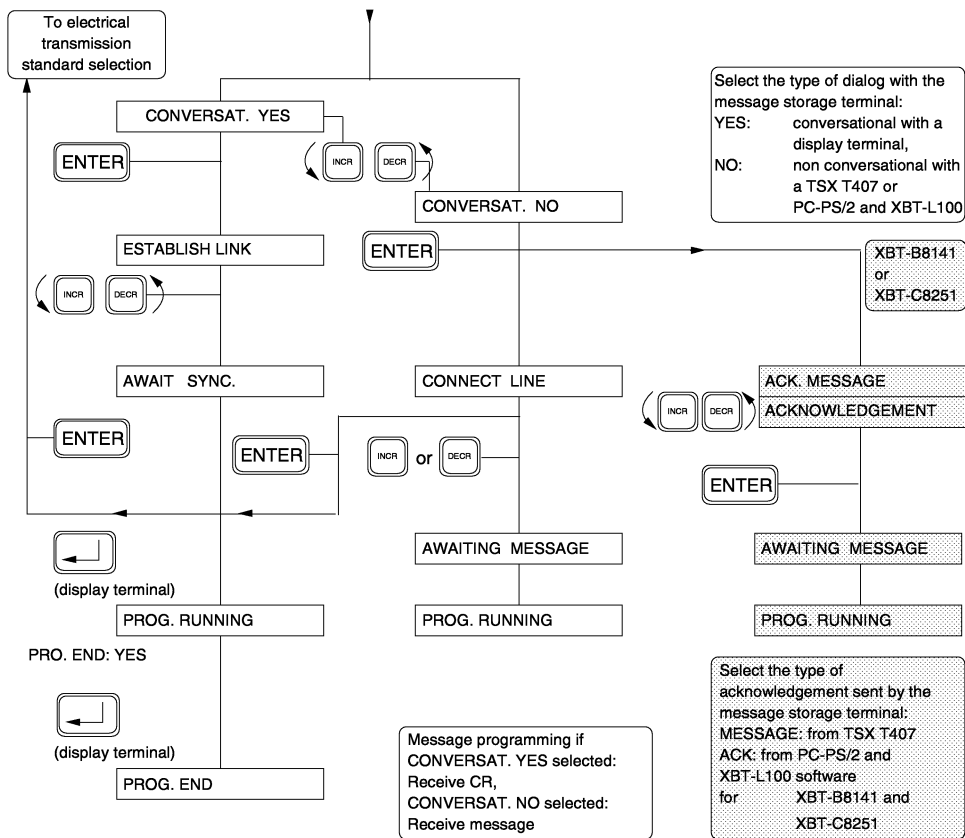
Accessing the menu:



Configuration Mode Memory Configuration



Configuration Mode Memory Configuration



Pressing **FUNCT** enters the line or printer configuration for XBT-B8141 and XBT-C8251 terminals.

THE PARAMETERS OF THE SERIAL LINK USED FOR STORING MESSAGES ARE SAVED ON OCCURRENCE OF

AWAIT SYNC. : IN CONVERSATIONAL MODE

AWAIT MESSAGE : IN NON CONVERSATIONAL MODE

IN CONVERSAT. NO AND MESS. ACKNOWLEDGEMENT, ACKNOWLEDGEMENTS ARE:

DISPLAYED BY DISPLAY TERMINAL

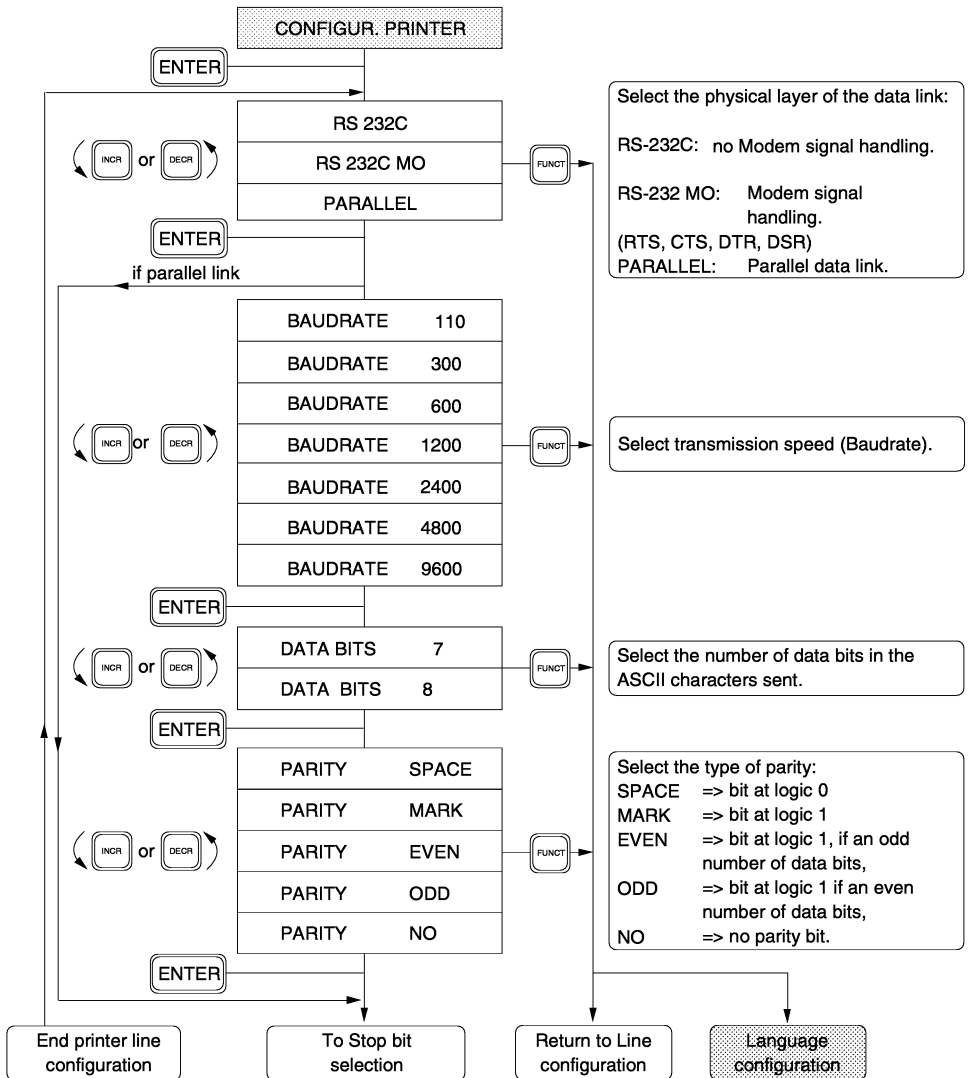
NOT DISPLAYED BY TSX T407 AND PC-PS/2

Configuration Mode

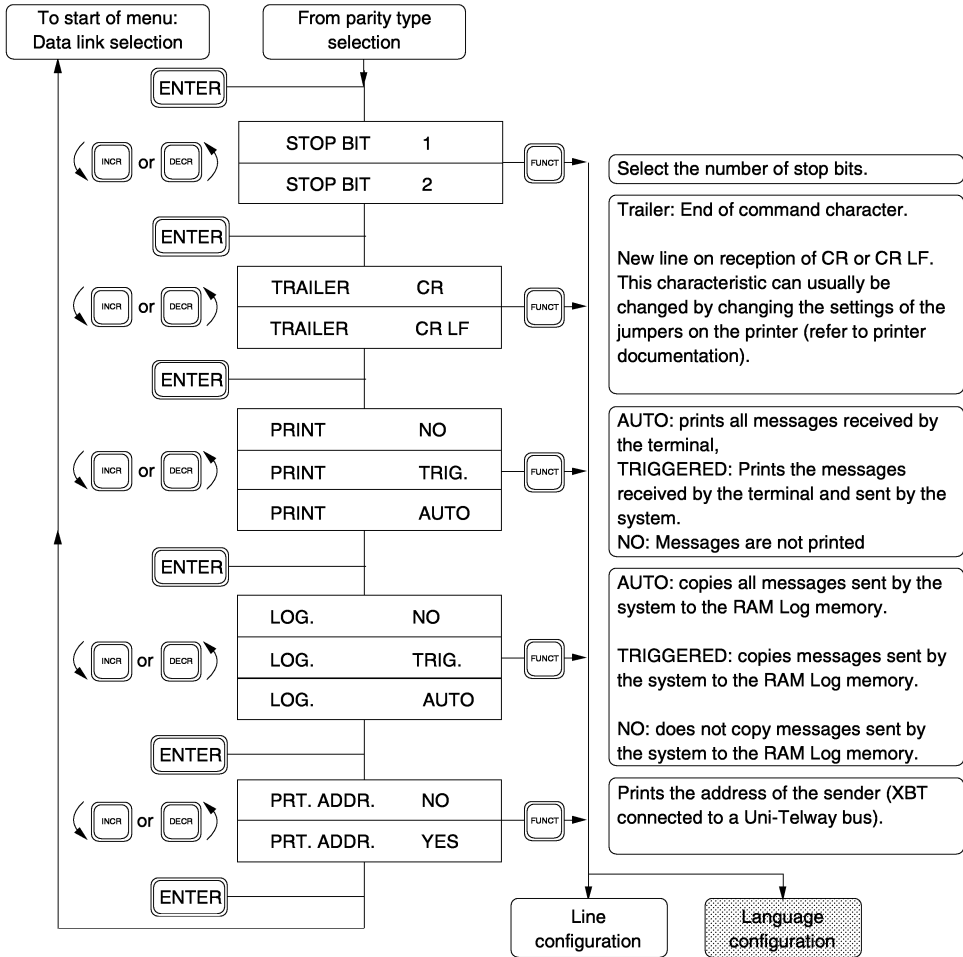
4.1.4 Printer Line Configuration

APPLIES TO XBT-B8141 AND XBT-C8251 TERMINALS FITTED WITH A PRINTER OUTPUT

Accessing the menu (refer to sub-section 4.1)



Configuration Mode Printer Line Configuration



PRESSING **FUNCT** AT ANY TIME RETURNS THE USER TO THE START OF THE CONFIGURATION MENU.

THE DEFAULT CONFIGURATION OF THE PRINTER LINE IS:

Data Link	: RS-232C	Print	: Triggered
Speed	: 9600 Baud	Log	: Triggered
Format	: 8 data bits	Print sender address	
Parity	: Odd	Trailer	: CR LF
Stop	: 1 stop bit		

4.2 Normal Mode

4.2.1 Basic Functions

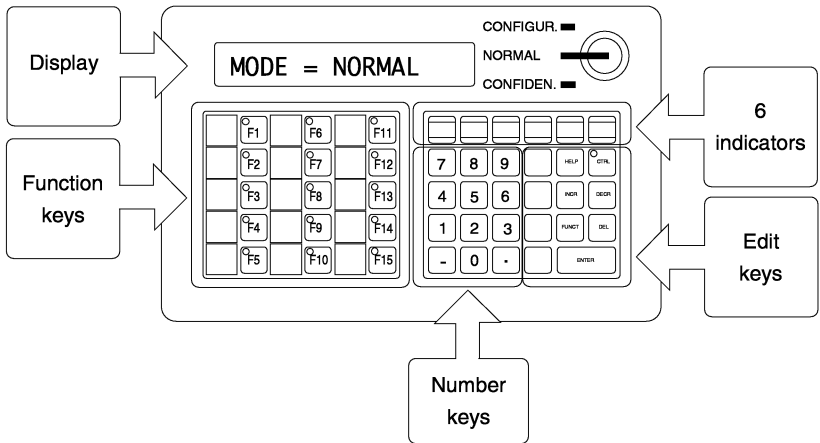
This is the normal mode of operation for the operator to use when the keyswitch is set to "Normal".

The XBT terminal displays MODE = NORMAL

THE KEY CAN ONLY BE REMOVED IN NORMAL MODE.

The terminal must respond to inputs from:

- the operator (by pressing a function key),
- commands sent by the system (buzzer code, stored message display code, etc.).



The operator can enter a command by:

- **direct access** : keys F1 to F15 on XBT-B ...
: keys F1 to F30 on XBT-C ...
- **indirect access** : keys FUNCT + X + X + ENTER

Note: XBT-B... : $16 \leq X X \leq 99$
XBT-C... : $31 \leq X X \leq 99$

Numerical responses can be entered by changing the blinking display digits, this is done by pressing

- DEL to clear ENTER to validate or acknowledge.
0 to 9 to enter - for the sign.

Normal Mode

4.2.2 Additional XBT-B8141 and XBT-C8251 Terminal Functions

When a printer is connected to the XBT terminal, the following functions are available:

- **Automatic Log**

Each time the display changes as a result of an operator action or a command, the XBT terminal will send the content of the display to the printer.

In Adjust or Uni-Telway mode, the display of a message with a changing variable will cause the display to be printed out every 10 seconds, if the value of the variable changes.

Example 1: XBT-B8141 in Adjust Mode

PRINTED PAGE

POWER-UP	
MESSAGE TEXT	ADDRESS
MODE = NORMAL	
START CYCLE	
INITIALIZATION	system
TEMP INSTRUCTION = 0 ___	system
TEMP INSTRUCTION = 123	
OVEN TEMP = 45	system
OVEN TEMP = 58	
OVEN TEMP = 66	
OVEN TEMP = 74	
COLOR ___	
COLOR BLACK	
MODEL ___	system
MODEL ROUND	
INIT COMPLETE	system
CYCLE IN PROGRESS	system
FAULT PUMP N 1	system
FAULT PUMP N 1	
AMOUNT = 0 _ %	system
AMOUNT = 78 %	
TEMPERATURE = 55	system

- The entire message text field is printed (text + numerical field),
- The "System" address shows that the contents of the display (and therefore the print-out) were changed by a command from the operating serial link line.

No printing is done in the address column, at the operator's request.

4 Operating Modes

Normal Mode Printing

Automatic Log

Example 2: XBT-C8251 in Uni-Telway Mode

PRINTED PAGE

TIME	MESSAGE TEXT	ADDRESS
POWER-UP 23-05-1989 17h 30mn 49s		
08-45-59	MODE = NORMAL	
08-46-22	START CYCLE	
08-47-00	INITIALIZATION	000 254 016 000 000
08-48-22	TEMP INSTRUCTION = 0 __	000 254 016 000 000
08-50-11	TEMP INSTRUCTION = 123	
08-50-15	OVEN TEMP = 45	000 254 016 000 000
08-50-25	OVEN TEMP = 58	
08-50-35	OVEN TEMP = 66	
08-50-45	OVEN TEMP = 74	
08-50-55	OVEN TEMP = 82	
08-51-05	OVEN TEMP = 90	
08-51-15	OVEN TEMP = 98	
08-51-25	OVEN TEMP = 106	
08-51-35	OVEN TEMP = 114	
08-51-45	OVEN TEMP = 122	
08-52-32	COLOR __	000 254 016 000 000
08-52-34	COLOR BLACK	
08-55-01	MODEL __	000 254 016 000 000
08-55-03	MODEL ROUND	
09-00-11	INIT COMPLETE	000 254 016 000 000
09-01-32	CYCLE IN PROGRESS	000 254 016 000 000
10-50-10	FAULT PUMP N 1	000 254 016 000 000
11-00-54	FAULT PUMP N 1	

- The entire message field is printed (text + numerical field).
- Address: The address of the sender (five Uni-Telway parameters: Network Nbr., Station Nbr., Gate Nbr., Module Nbr., Channel Nbr.). No printing is done in the address column on operator request.
- When an XBT-C8251 terminal is used, the time is printed out.

Normal Mode Printing

- **"Triggered" copy**

On reception of a command from the system, the XBT terminal can perform three types of processing, depending on the parameters selected when the printer line was configured:

PRINTER LINE CONFIGURATION	XBT RESPONSE
PRINT TRIG. + LOG OFF	Displays and prints the messages requested by the PLC.
PRINT TRIG. + LOG TRIG.	Displays and prints the messages and stores the last 230 messages requested by the PLC.
PRINT TRIG. + LOG AUTO.	Displays and prints the messages requested by the PLC. Stores all messages displayed by the terminal (operator entered or sent by the PLC).

OPERATOR COMMANDS ARE ACCEPTED
BUT NOT PRINTED

- **"Transparent" copy**

The XBT terminal is separated into three different resources:

- Display (D),
- Printer (P),
- Log (H).

A command can be used to access one of these resources directly (see sub-section 6.7 for a table summarizing the various means of access depending on the attribute assigned to a command).

THE COMPLETE SET OF COMMANDS REQUIRED IN NORMAL
MODE ARE DESCRIBED IN SECTION 6, COMMUNICATION.

4.3 Confidential Mode

This mode is a superset of the Normal mode.

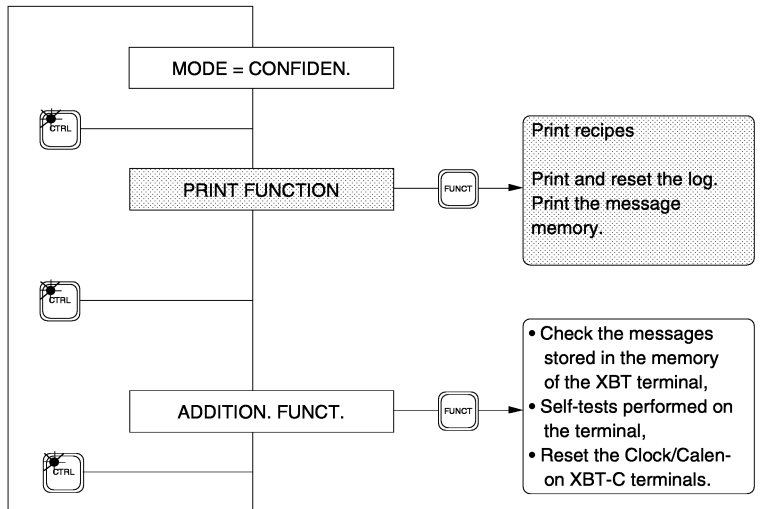
This mode is accessed by setting the keyswitch to the Confidential mode, the XBT terminal displays: MODE = CONFIDEN.

Confidential mode enables access to:

- NORMAL MODE enabling access to message parameters that are locked by software key when stored in memory and their modification.
- ADDITIONAL FUNCTIONS:
 - Read the message memory,
 - Self-tests,
 - Reset the clock/calendar (on XBT-C...).

Print function:
for XBT-B8141 and XBT-C8251

4.3.1 Confidential Mode Menu

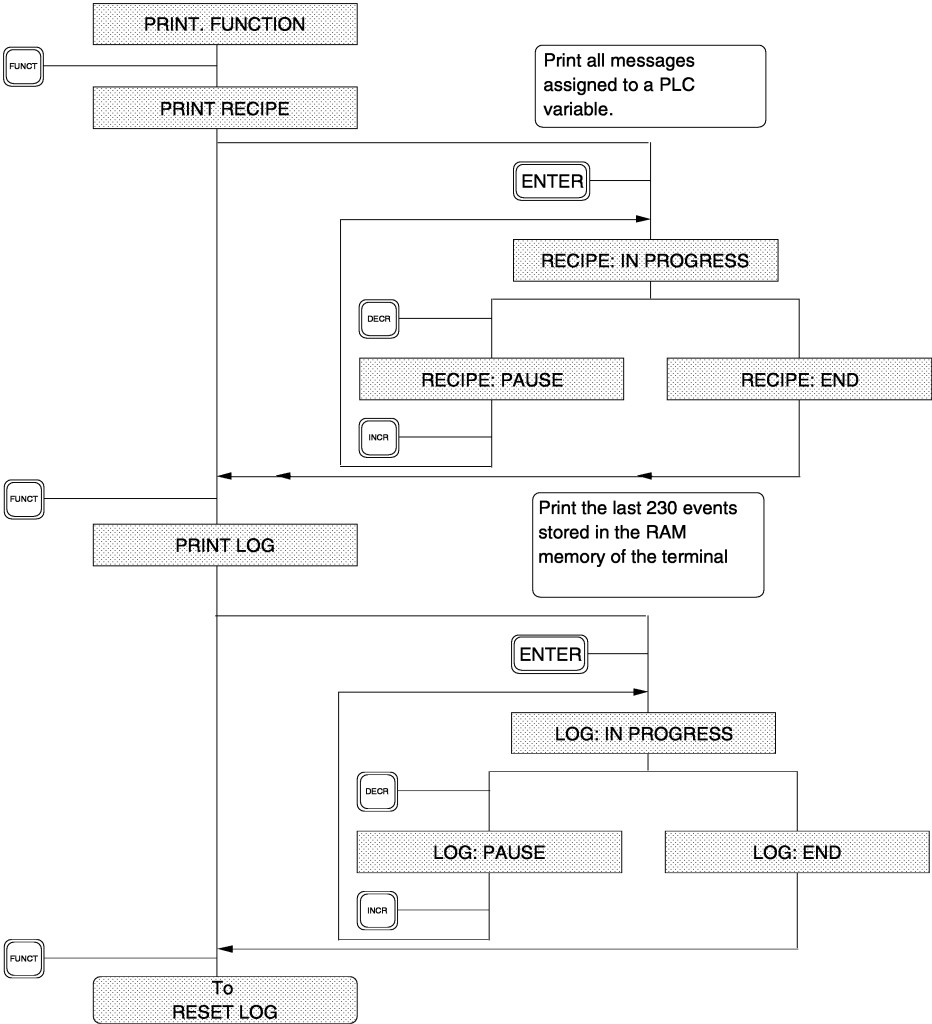


- IN THE ADDITIONAL FUNCTIONS MODE, THE XBT TERMINAL DOES NOT ACCEPT COMMANDS FROM THE LINE (LOGICAL DISCONNECTION).
- WHEN THE XBT TERMINAL IS NOT CONNECTED TO A TSX SERIES 7 PLC, ADDITIONAL FUNCTIONS CAN ONLY BE ACCESSED IN ASCII AND UNI-TELWAY MODES.

Confidential Mode

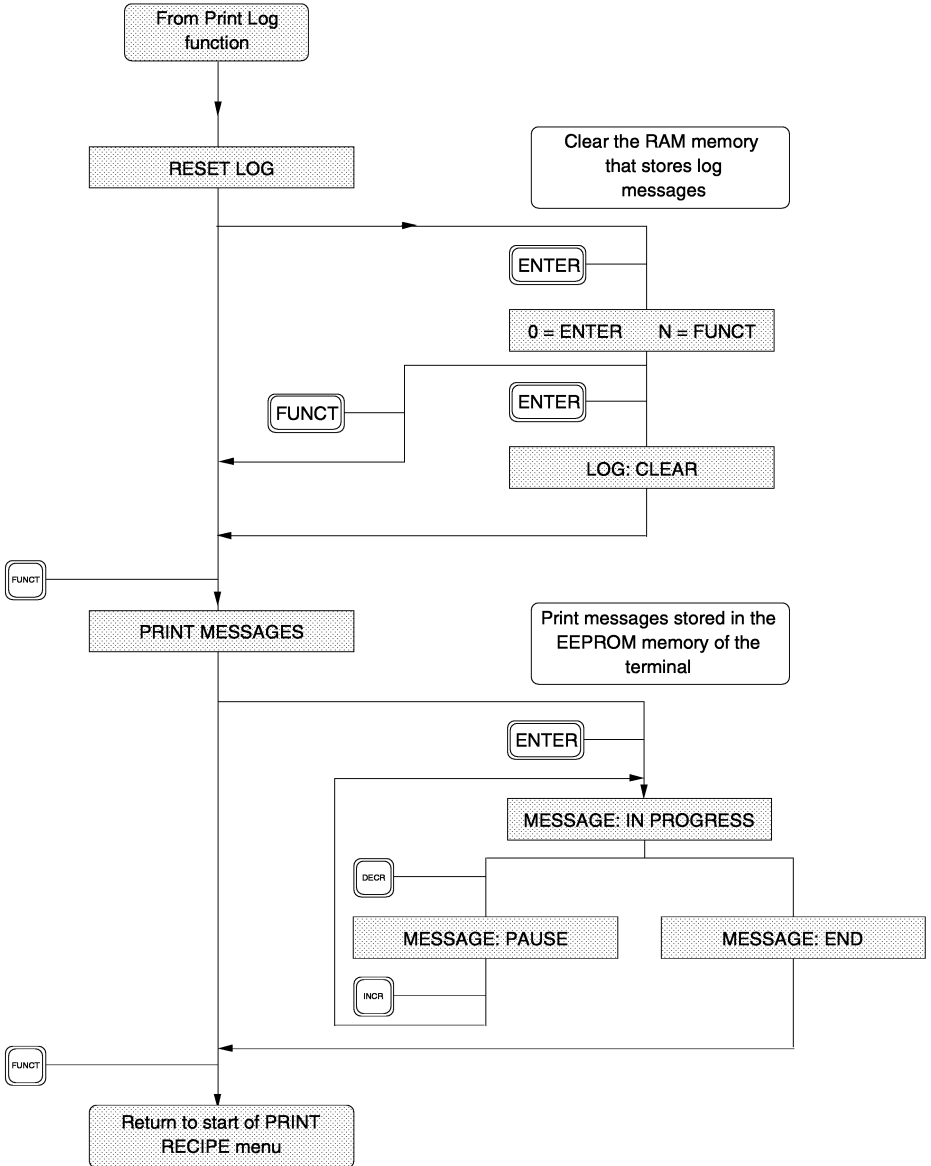
4.3.2 Print Functions (XBT-B8141 and XBT-C8251 Only)

- Menu selections



Confidential Mode

Print Functions (XBT-B8141 and XBT-C8251)



Confidential Mode Print Functions (XBT-B8141 and XBT-C8251)

For each type of print-out:

- press **ENTER** to start printing,
- press **DECR** suspends printing in progress,
- press **INCR** restarts the suspended printing.

At any time it is possible to change operating mode:

- press **FUNCT** (to select another type of print-out),
- press **CTRL** (selects Additional Functions mode, refer to sub-section 4.3.3).
- Select Normal Mode (turn the key).

In the Printer Function mode, the XBT terminal remains on-line with the automated system, but commands from the system are no longer accepted by the terminal.

• Printing recipes

Only messages with an assigned TSX Series 7 PLC variable are printed with an embedded variable in the response field of the message.

Example:

Nbr.	Message Text	Stat	Coef	Var.	Net	Sta	Gate	Mod	Ch
001	START CYCLE	OFF	1	B0001	000	254	016	000	000
004	TEMP = _ 3		1	W0123	000	254	016	000	000
005	OVEN TEMP = _ 67		1	W0124	000	254	016	000	000
006	COLOR 33		1	W0010	000	254	016	000	000
007	MODEL 33		1	W0011	000	254	016	000	000
011	AMOUNT = _ 8 %		1	W2010	000	254	016	000	000
012	TEMPERATURE = 22		1	W2001	000	254	016	000	000

- The Uni-TE[®] parameters of each message are systematically printed,
- If the response field of the message is insufficient, \$ signs are printed in the Status column,
- If a variable fault occurs (the variable does not exist in the PLC), ? marks are printed in the Status column.

4 Operating Modes

Confidential Mode Print Functions (XBT-B8141 and XBT-C8251)

- When the numerical value does not fill the entire response field, the dashes displayed in the numerical field are not printed.
When type F (function key command) messages are used, without a response field, the "Status" column shows the status of the bit assigned to the message using ON if the bit is at 1 or OFF if the bit is at 0. If a word is assigned, the value of its contents (0 to 99) corresponding to the number of the function key is printed.

- **Log print-out**

The log memory can store up to 230 records.

Each record includes its time of occurrence (XBT-C8251), the message and its address.

WHEN THE LOG MEMORY IS FULL, THE OLDEST EVENTS ARE LOST AND REPLACED BY MORE RECENT ONES.

Note: A line command can be used by the system to poll the XBT on the status of the log (the number of records remaining free). This command is described in sub-section 6.7.5, System to XBT Command (Read Terminal Status).

Example of a log print-out: (using an XBT-C8251)

07.29.51	MODE = NORMAL					
07.34.42	START CYCLE	000	254	005	254	101
08.15.30	TEMP.OVEN5 = - - -	000	254	005	254	101
08.15.37	TEMP.OVEN5 = 535C	000	254	005	254	101
08.17.15	VALUE OVEN5 = 527C	000	254	005	254	101

4 Operating Modes

Confidential Mode Print Functions (XBT-B8141 and XBT-C8251)

- **Clear the Log Memory**

The Log memory can be cleared by the operator in Confidential mode.

It can also be cleared during normal operation by the system. Refer to section 6, Communication.

- **Printing the content of the message memory**

The print-out format used for the contents of the EEPROM memory is the same as XBT-L100 (message creation program) print-out format.

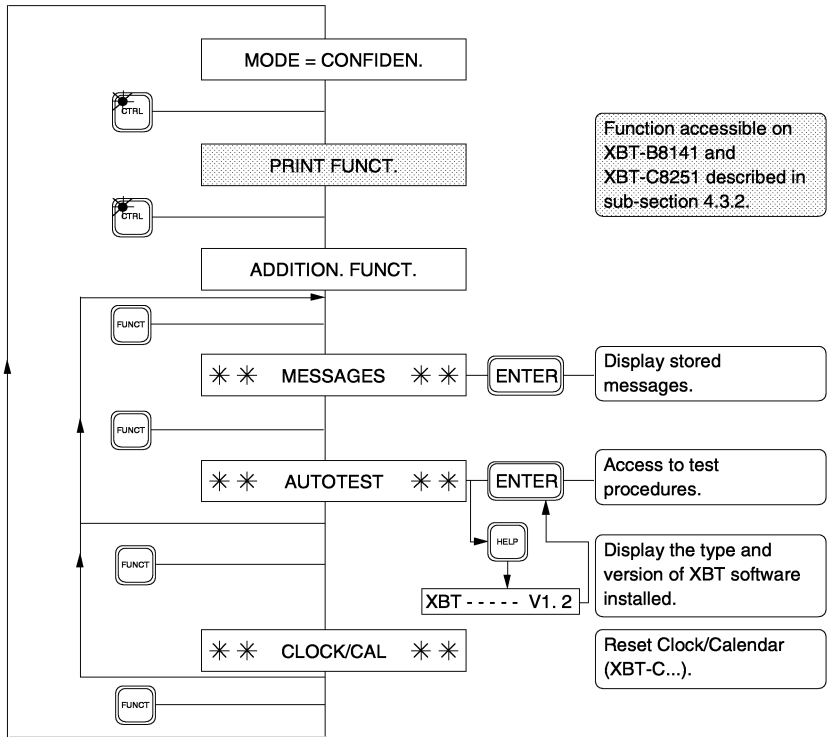
Example:

Nbr	X	Y	Message Text	T	K	C	Var.	A	Net	Sta	Gate	Mod	Ch
001	00	1	START CYCLE	F	1	1	B0001	#	000	254	016	000	000
002	00	1	INITIALIZATION	V	1	1	#	#	000	254	016	000	000
003	00	1	BLACK	V	1	1	#	#	000	254	016	000	000
004	00	1	TEMP INSTRUCT.= _ _ _	N	1	1	W0123	#	000	254	016	000	000
005	00	1	OVEN TEMP = _ _ _ _	V	1	1	W0124	#	000	254	016	000	000
006	00	1	COLOR _ _	F	1	1	W0010	#	000	254	016	000	000
007	00	1	MODEL _ _	F	1	1	W0011	#	000	254	016	000	000
008	00	1	INIT COMPLETE	V	1	1	#	#	000	254	016	000	000
009	00	1	CYCLE IN PROGRESS	V	1	1	#	#	000	254	016	000	000
010	00	1	FAULT PUMP N 1	D	1	1	#	#	000	254	016	000	000
011	00	1	AMOUNT = _ _ %	N	1	1	W2010	#	000	254	016	000	000
012	00	1	TEMPERATURE = _ _	V	1	1	W2001	#	000	254	016	000	000
045	00	1	ROUND	V	1	1	#	#	000	254	016	000	000

Confidential Mode

4.3.3 Additional Functions

Additional Functions are accessed as shown below:



4 Operating Modes

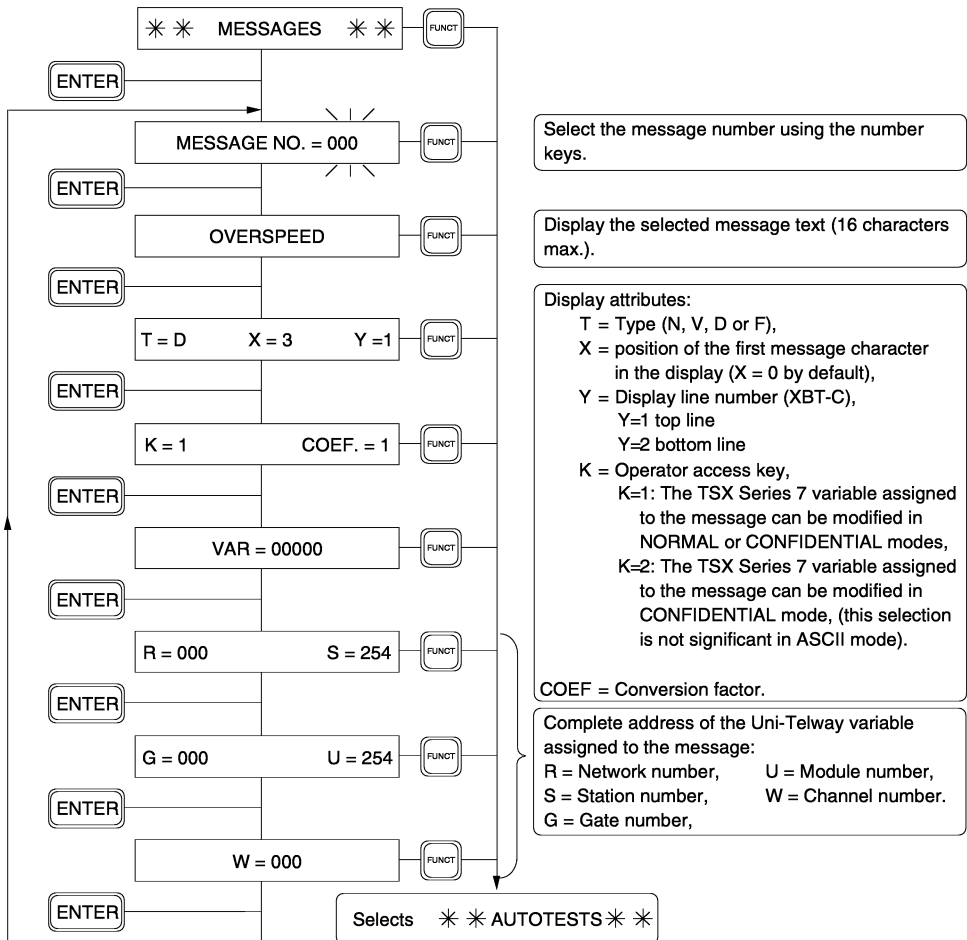
Confidential Mode Additional Functions

• Display stored messages **MESSAGES**

This function enables the operator to check messages stored in the memory of the terminal. The messages are accessed by:

- Entering the message number when MESSAGE NO. = XXX appears,
- Automatic message number incrementation by the XBT terminal at the end of each test sequence.

IF THE SELECTED MESSAGE DOES NOT EXIST, THE XBT TERMINAL DISPLAYS NO MESSAGE

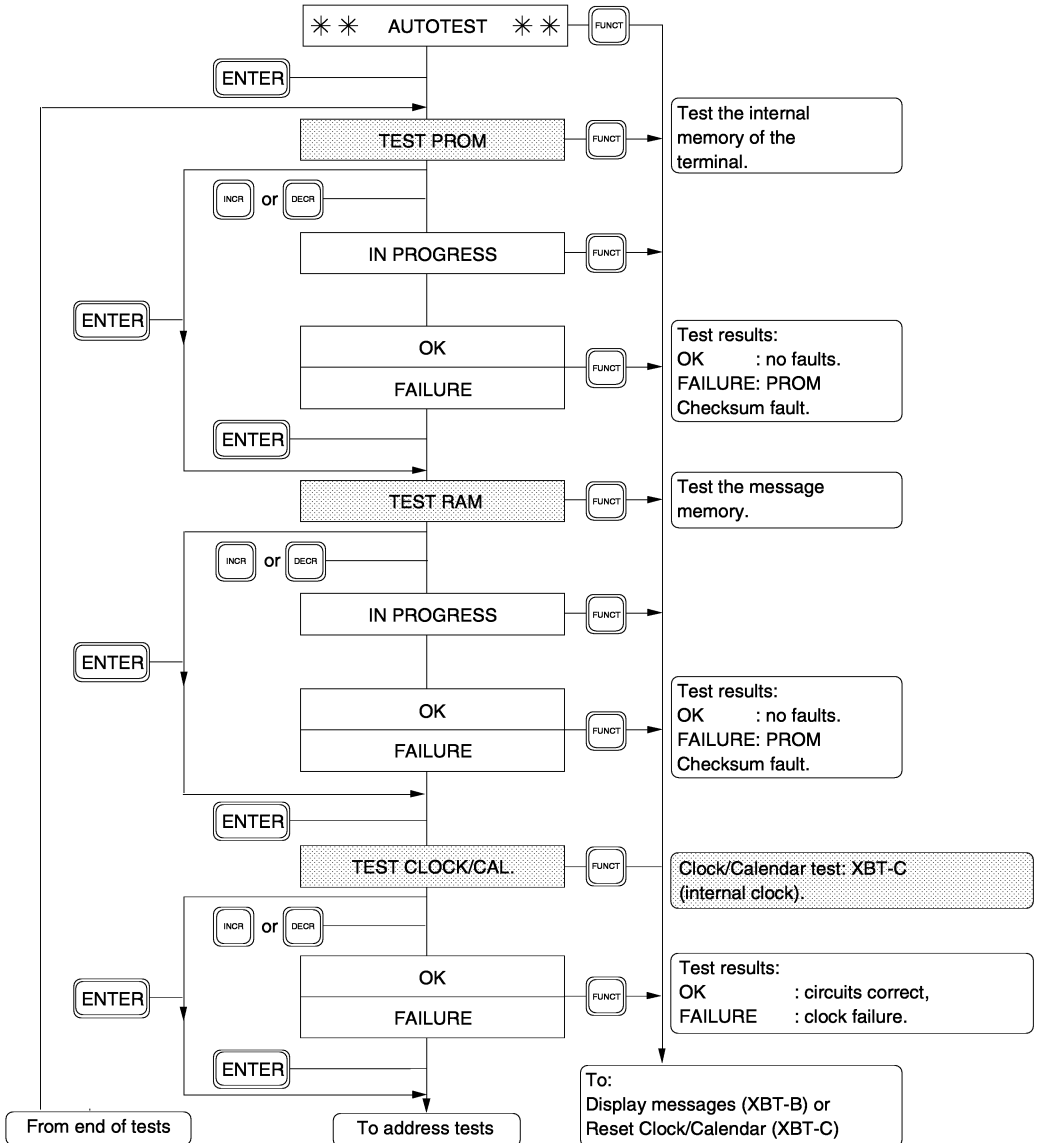


4 Operating Modes

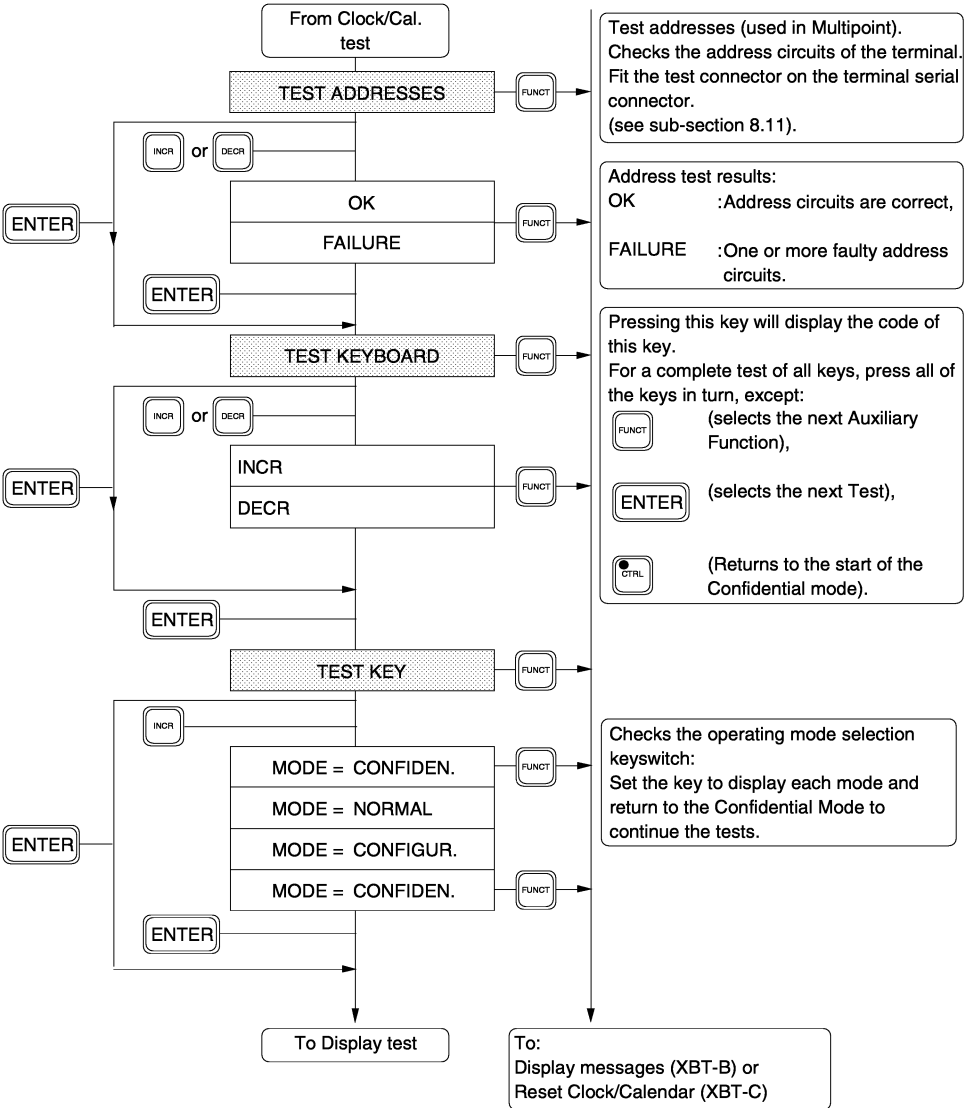
Confidential Mode Additional Functions

• Self-tests

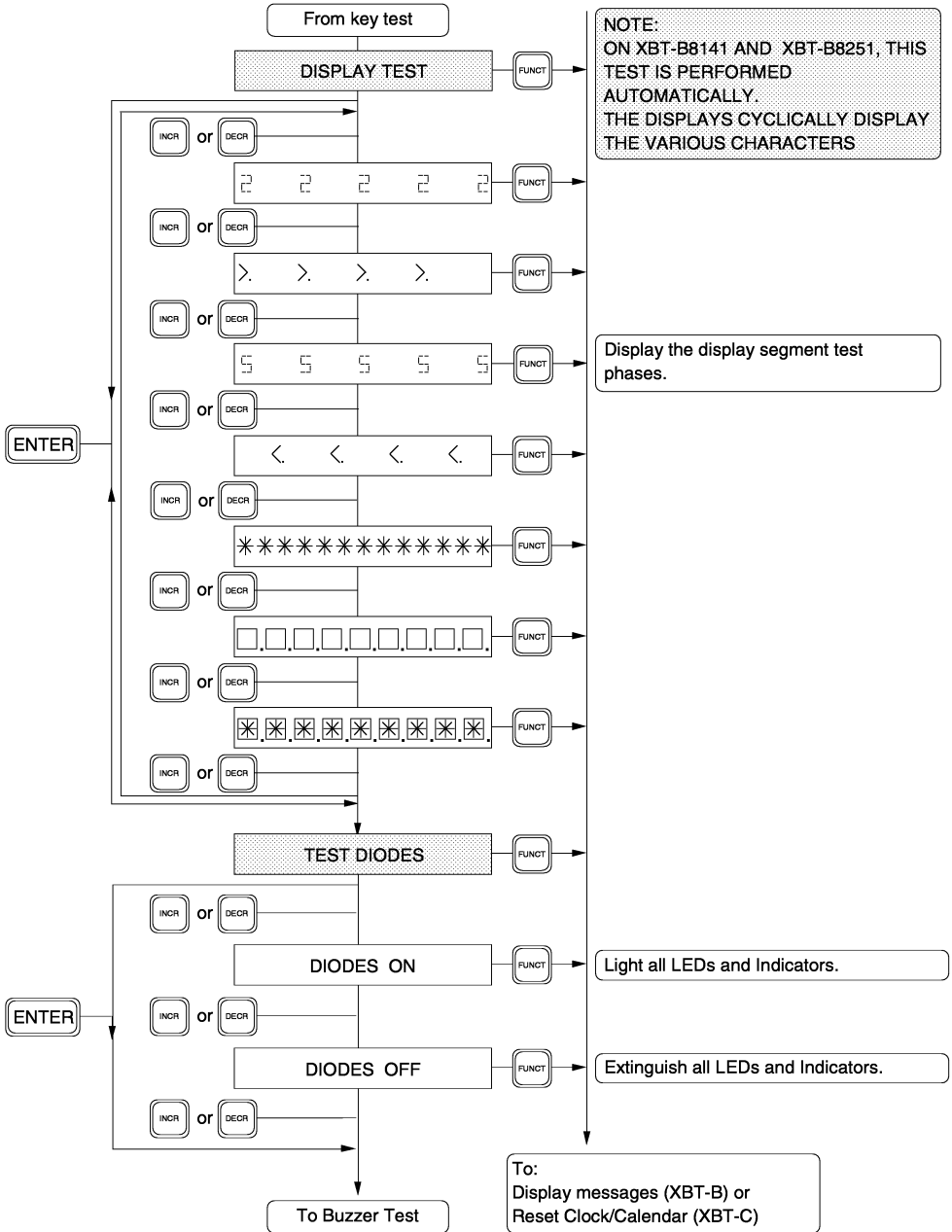
The self-tests check that the various sub-units of the terminal are operating correctly.



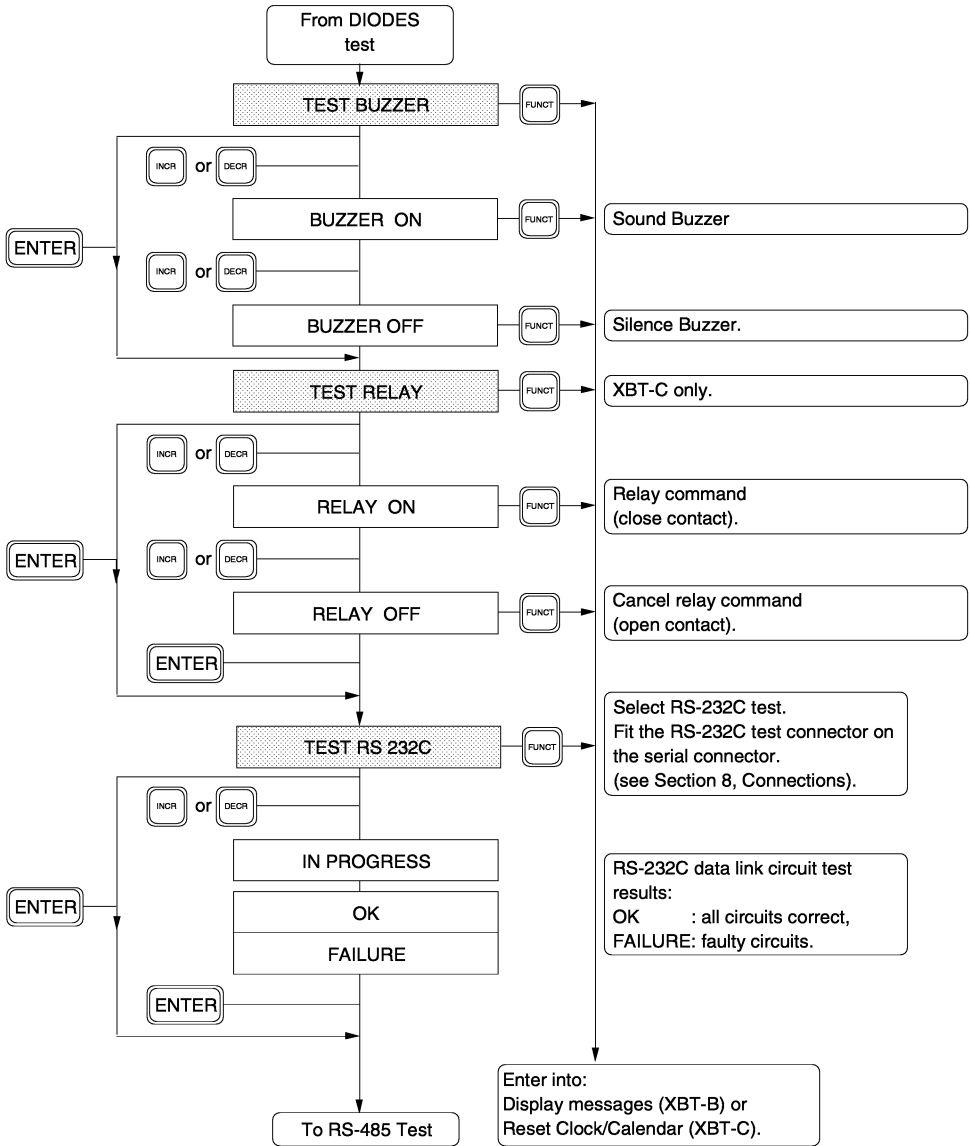
**Confidential Mode
Additional Functions (Self-tests)**



Confidential Mode Additional Functions (Self-tests)

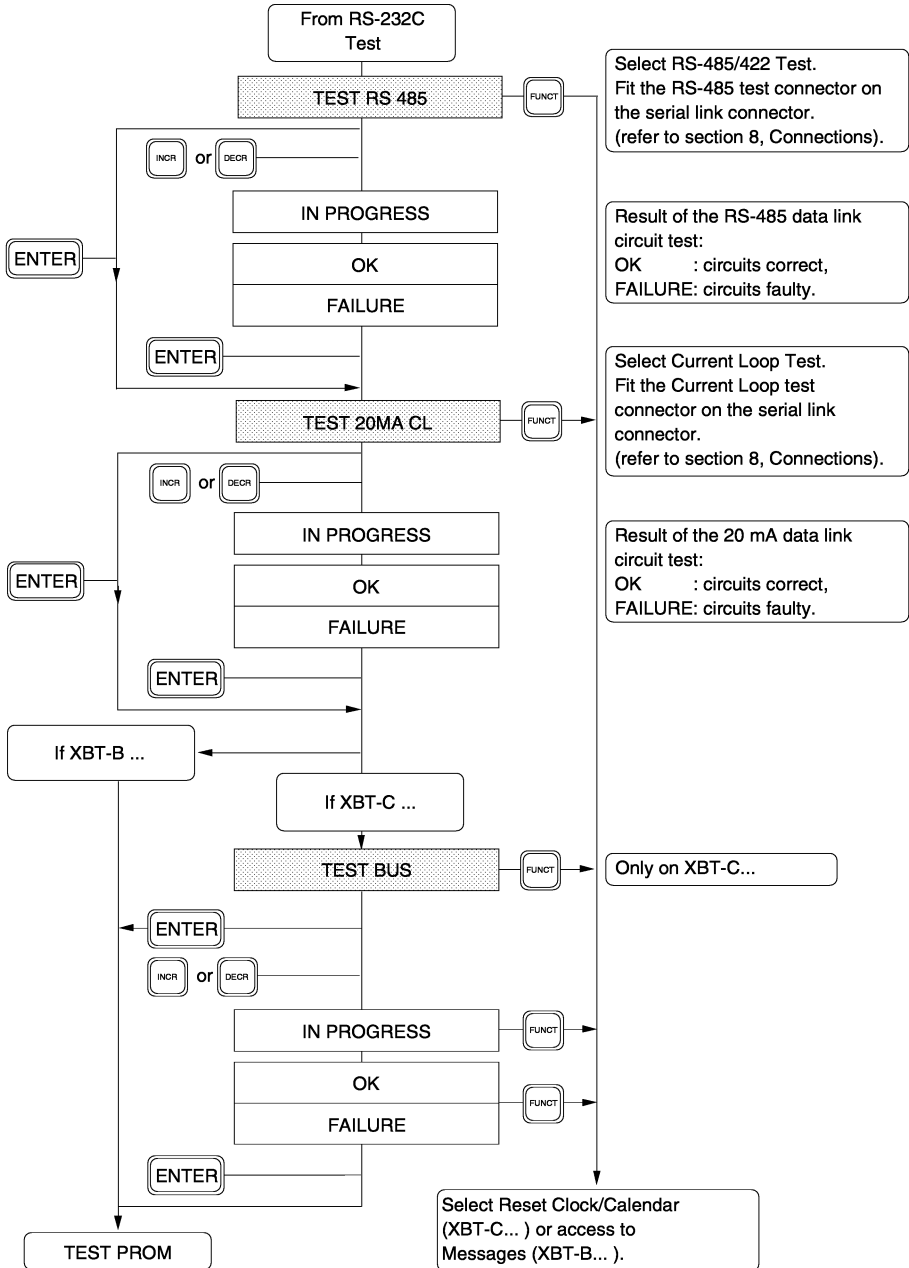


Confidential Mode Additional Functions (Self-tests)



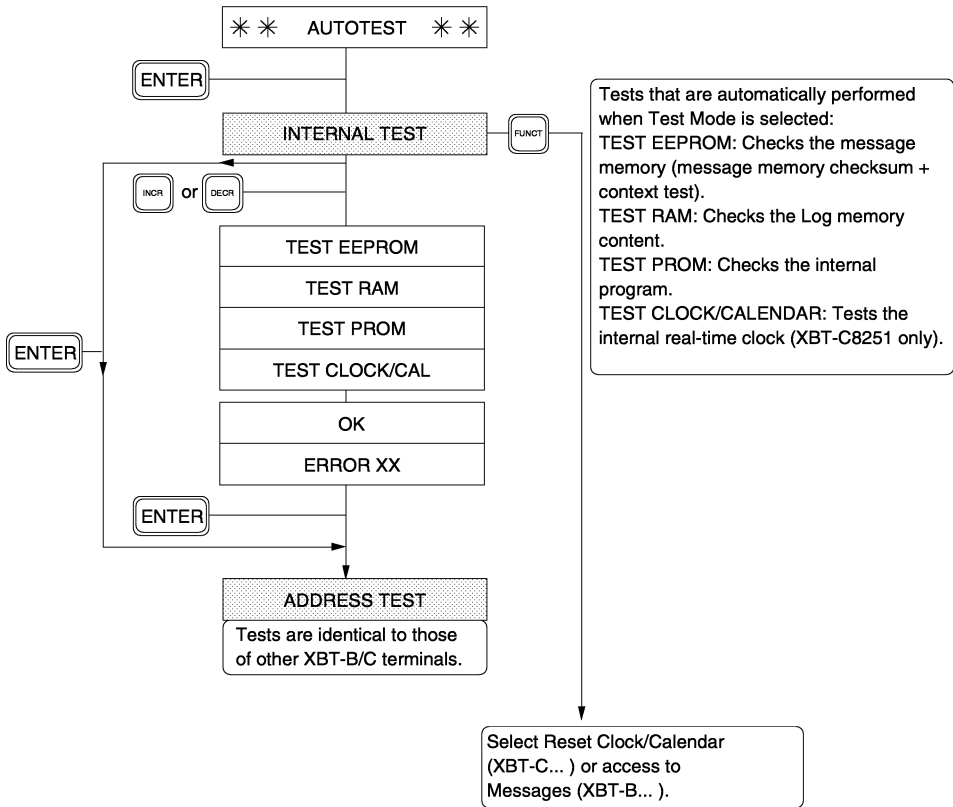
4 Operating Modes

Confidential Mode Additional Functions (Self-tests)



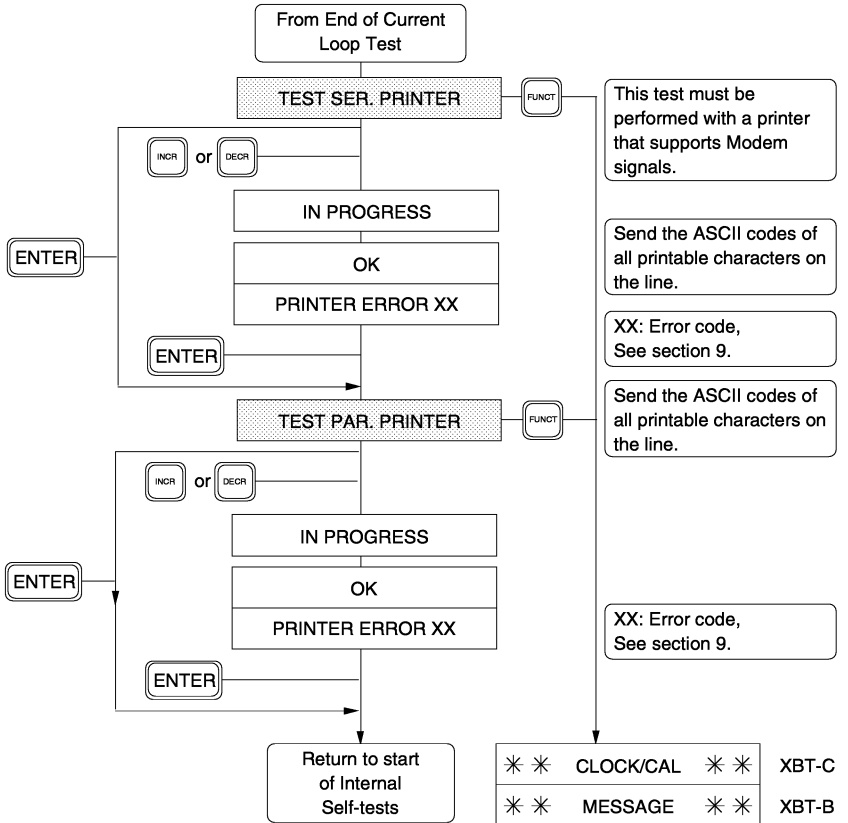
Confidential Mode
Additional Functions (Self-tests)

FUNCTIONS THAT ARE SPECIFIC TO XBT-B8141 AND XBT-C8251 TERMINALS FITTED WITH AN EEPROM MESSAGE MEMORY, LOG RAM MEMORY AND A PRINTER INTERFACE.



4 Operating Modes

Confidential Mode Additional Functions (Self-tests)



Confidential Mode Additional Functions

Resetting the Clock/Calendar


This menu can only be accessed on XBT-C... terminals.

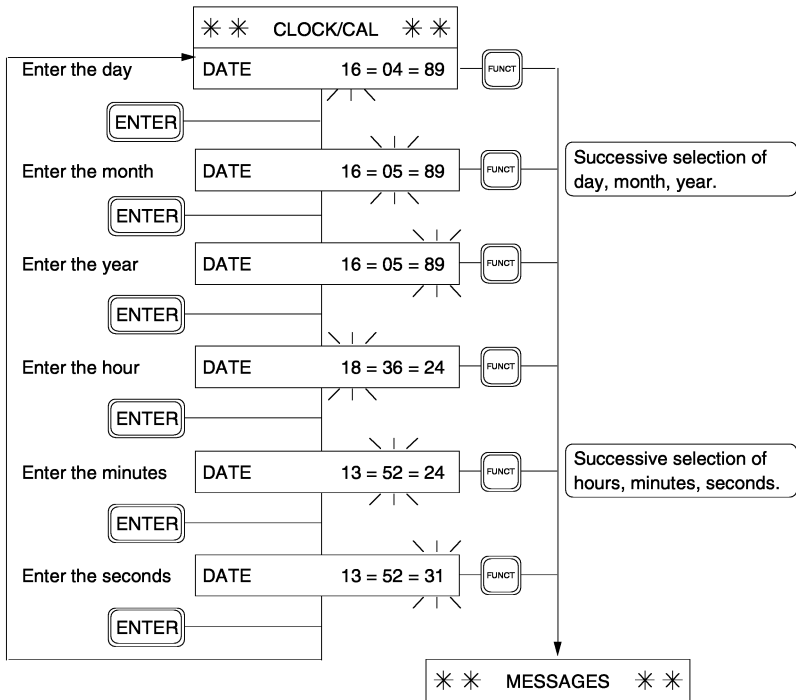
The internal real-time clock has two battery backed-up (30 days autonomy) configurable registers:


- The date register : day, month, year,
- The time register : hours, minutes, seconds.

IN NORMAL MODE IT IS POSSIBLE TO ACCESS (READ / WRITE)
THE CLOCK / CALENDAR REGISTERS.
CLOCK / CALENDAR COMMANDS ARE DESCRIBED IN
SUB-SECTION 6.5.12.

Access to initialization:

 blinking



THE  **CTRL** KEY CAN BE PRESSED AT ANY TIME TO QUIT THE ADDITIONAL FUNCTIONS MODE.

5.1 General

To store messages in the XBT, it is necessary to connect it via its serial link to a:

- TSX T407 programming terminal,
- Display terminal,
- PC-PS/2 with XBT-L100 programm installed.

The electrical connections required for each of these devices are described in section 8, Connections.

The parameters of the serial link used to connect to the programming terminals are described in Configuration Mode information (refer to sub-section 4.1.3).

THE SELECTED LINE PARAMETERS ARE SAVED WHEN THE FOLLOWING MESSAGES ARE DISPLAYED:

**AWAITING SYNC. (with conversational dialog),
AWAITING MESSAGE (without conversational dialog).**

Message storage is considered conversational (Conversat. Yes: selection made) when the XBT displays all of the parameters of the messages to be stored in an interactive fashion.

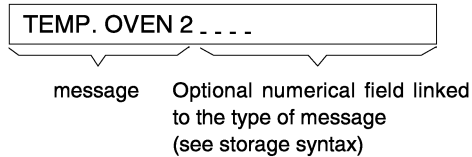
Message storage is considered non-conversational (Conversat. No: TSX T407 or PC-PS/2 selection made) when the user enters the messages to be stored without the benefit of an interactive dialog.

ATTENTION: DO NOT CUT THE POWER SUPPLY TO THE TERMINAL BEFORE QUITTING THE STORAGE MODE (A CHECKSUM ERROR WILL OCCUR ON POWER-UP).

Syntax

5.2.2 General Rules for Message Entry

- Structure of the "message text" field



- The length of the text and the numerical field must not exceed 16 characters,
- The numerical field must be identified by dashes (- ASCII character 5F),
- Only ASCII characters between 20 and 5F are accepted (lower case entries are rejected).
- A comma (ASCII character 2C) becomes a period (ASCII character 2E).

5.2.3 Specific Rules for Adjust and Uni-Telway Modes (for use with TSX Series 7 PLCs)

- The numerical field assigned to a PLC variable can have a maximum length of 6 characters, including the sign,
 - positive values: the + is not displayed (space),
 - negative values: the - sign is displayed,
- The numerical field can have a maximum length of 5 characters when a conversion factor is used ($c \neq 1$) or when the TSX Series 7 variable is a counter or a monostable,
- The numerical field assigned to a TSX Series 7 PLC bit can have a maximum length of 1 character.

5 Storing Messages

Syntax

Specific Rules for Adjust and Uni-Telway Modes

- Accessible TSX Series 7 PLC Variables:

TSX SERIES 7 PLC VARIABLES		TYPE OF MESSAGE			
FUNCTION	SYNTAX	F	V	N	D
INTERNAL BIT	B XXXX	X	X	X	
WORD	W XXXXX	X	X	X	
CONSTANT WORD	CW XXXXX		X		
COMMON WORD	COM XX,X		X		
TIMER	T XXX (V or P)		V	P	
MONOSTABLE	M XXX (V or P)		V	P	
COUNTER	C XXX (V or P)		V	P	
DRUM CONTROLLER	D XXX (V)		X		

V = Current value

X = Authorization

P = Preset

Note: The syntax limits that apply to TSX Series 7 PLC variables depend on the type of PLC used.

Syntax
Specific Rules for Adjust and Uni-Telway Modes

The numerical fields that are given below are maximum values.

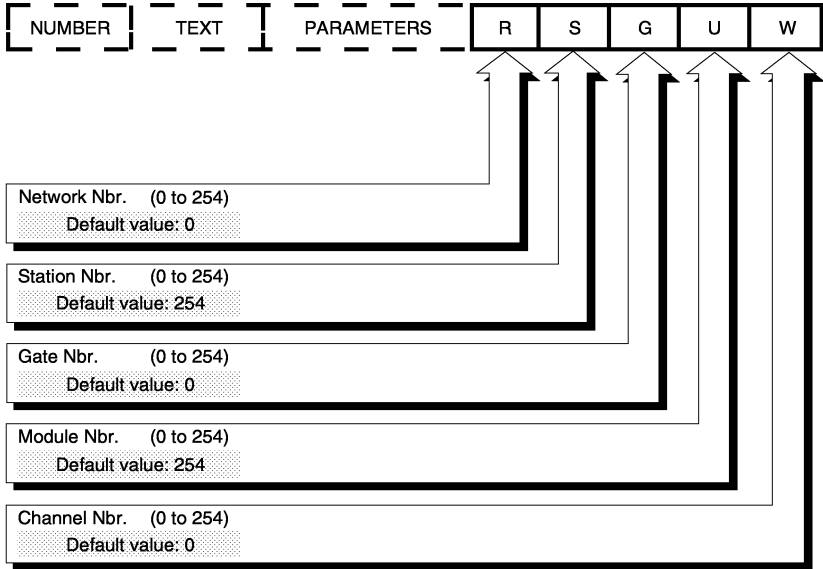
TYPE	MESSAGE																COLUMN X	XBT-C LINE Y	ACCESS KEY K	FACTOR COEF.	TSX 7 VARIABLE VAR.	COMMENTS
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
FUNCTION (F)	R	U	N														0 to 16	1 or 2	1	1	BIT	UNI-TE /ADJUST (write the bit)
																		1 or 2	1	1	BIT	UNI-TE /ADJUST (write the bit without display)
	C	O	L	O	R				-	-							0 to 16	1 or 2	1	1	WORD	UNI-TE /ADJUST (write the access code in the word)
	C	O	L	O	R				-	-							0 to 16	1 or 2	1	1		ASCII
DISPLAY (M)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0 to 16	1 or 2	1 or 2	1		ASCII
	V	A	L	U	E	=	-	-	-	-	-						0 to 16	1 or 2	1 or 2	0.001 to 1		ASCII
	V	A	L	U	E	=	-	-	-	-	-	C					0 to 16	1 or 2	1 or 2	1	All Objects (not bits)	UNI-TE /ADJUST (signed value)
	V	A	L	U	E	=	-	-	-	-	-	C					0 to 16	1 or 2	1 or 2	0.001 to 1	All Objects (not bits)	UNI-TE /ADJUST (signed value)
	S	T	A	T	U	S	=	-									0 to 16	1 or 2	1 or 2	1	BIT	UNI-TE /ADJUST (display bit status)
		T	R	A	N	S	F	E	R								0 to 16	1 or 2	1 or 2	1		ASCII / UNI-TE /ADJUST
NUMERICAL (N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0 to 16	1 or 2	1 or 2	1		ASCII
	N	U	M	B	E	R	=	-	-	-	-	-	C				0 to 16	1 or 2	1 or 2	0.001 to 1		ASCII
	N	U	M	B	E	R	=	-	-	-	-	-	C				0 to 16	1 or 2	1 or 2	1	All Objects (not bits)	UNI-TE /ADJUST (signed value)
	N	U	M	B	E	R	=	-	-	-	-	-	C				0 to 16	1 or 2	1 or 2	0.001 to 1	All Objects (not bits)	UNI-TE /ADJUST (signed value)
	S	E	N	S	O	R		S	T	A	T	U	S	=	-			0 to 16	1 or 2	1 or 2	1	BIT
BLINKING (D)	P	R	E	S	S	.											0 to 16	1 or 2	1 or 2	1		ASCII / UNI-TE /ADJUST

5 Storing Messages

Syntax

5.2.4 Specific Rules for Uni-TE Protocol

When an XBT-B8/C8 terminal is connected to a Uni-Telway bus, the message storage syntax must include the Uni-Telway address parameters of the device that is designated by the variable assigned to the message.



5.3 Storing Messages with a Display Terminal

The terminal must be connected to the Display Terminal (as described in section 8, Connections).

To establish the dialog between the XBT-B.../C... terminal and the Display Terminal, the transmission parameters on both devices must be set correctly.

The XBT terminal parameters are selected in Configuration Mode (refer to sub-section 4.1.3 Memory Configuration).

The procedure is:

- Select the type of data link : RS-232 C,
- Select the line parameters (speed, format, parity and stop bit).
- Select the dialog mode : CONVERSAT. YES (conversational)
- Pressing **ENTER** displays the message CONNECT LINE
- Pressing **INCR** or **DECR** displays the message AWAITING SYNC. The XBT terminal is waiting for the synchronization signal from the display terminal: Press **↩** to acknowledge.

The transmission parameters of the Display Terminal are set to match those of the XBT terminal used or vice versa. Once this is done, press **↩** on the Display Terminal keyboard.

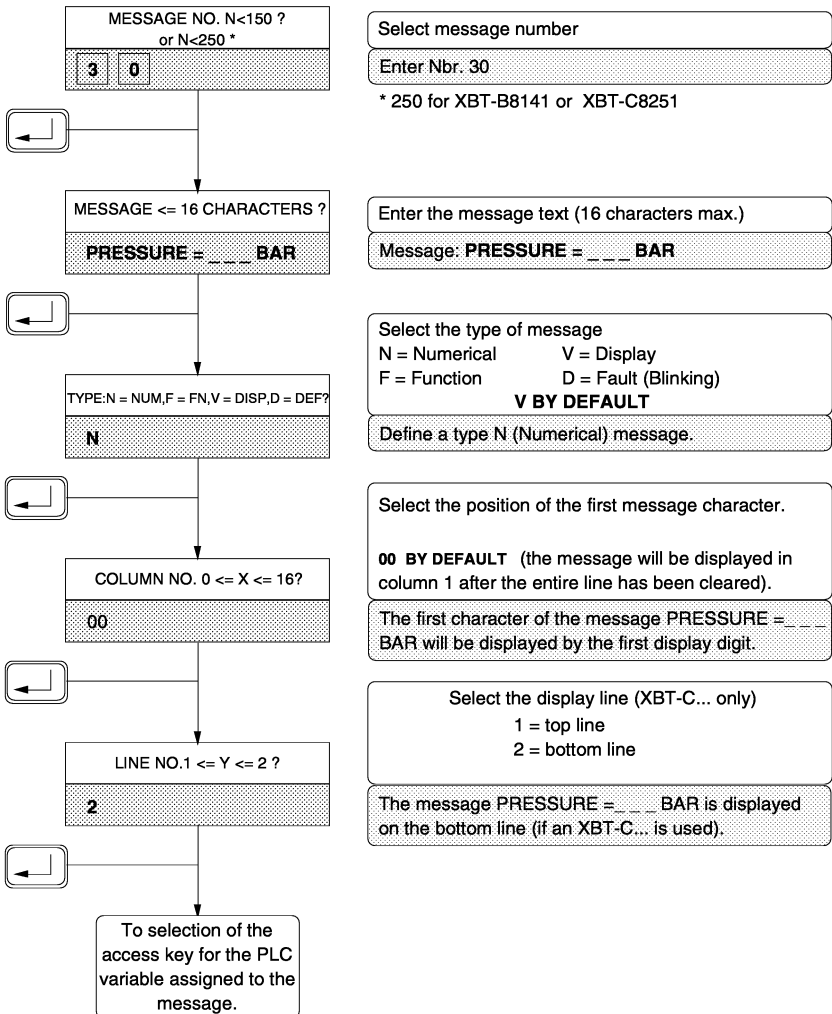
The XBT terminal displays **PROG. RUNNING** and messages to be stored can be entered on the Display Terminal.

Storing Messages with a Display Terminal

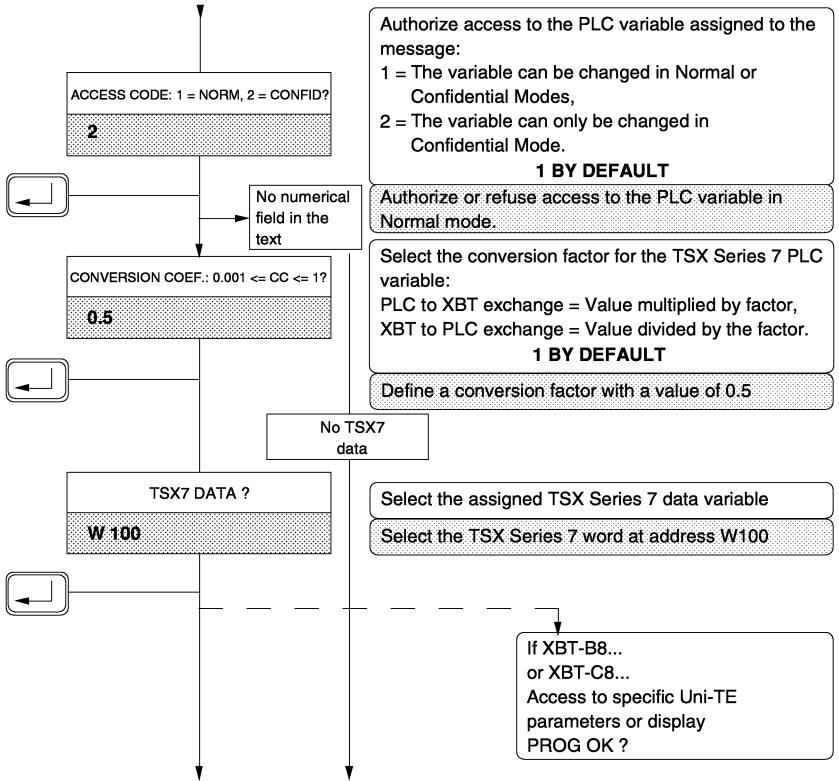
• Video display of the storage dialog

If the text already exists, press **DEL** to delete

questions displayed, operator entries.



Storing Messages with a Display Terminal



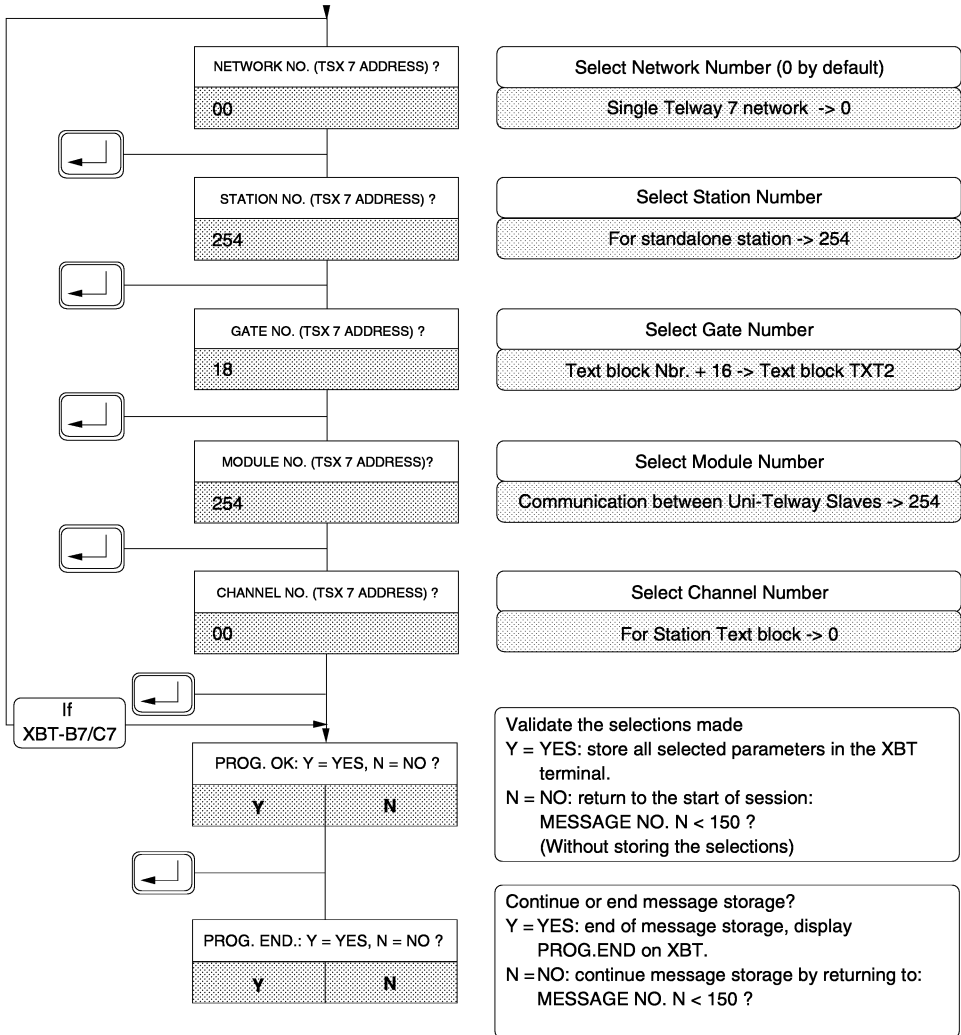
MESSAGE NO.	: N < 150	? 030
MESSAGE	: <= 16 CHARACTERS	? PRESSURE = - - BAR
TYPE	: N = NUM, F = FN, V = DISP, D =DEF	? N
COLUMN NO.	: 0 <= X <= 16	? 00
LINE NO.	: 1 <= Y <= 2	? 02
ACCESS CODE	: 1 = NORM., 2 = CONFID.	? 1
CONVERSION COEF.	: 0.001 <= CC <= 1	? 0.5
TSX7 DATA		? W100
PROG. OK	: Y = YES	? 0
PROG. END	: N = NO	? 0

DISPLAY ALL OF THE SELECTIONS MADE FOR THE SELECTED MESSAGE NUMBER.

Storing Messages with a Display Terminal

• Additional Uni-TE Protocol Parameters (XBT-B8... and XBT-C8...)

In this mode, five additional questions are displayed for the operator to respond to. These define the address of the PLC to which the variable assigned to the message belongs to (refer to sub-section 5.2.3).



5.4 Storing Messages with a PC-PS/2 and XBT-L100 Programm

The terminal must be connected to the PC-PS/2 computer (as described in section 8, Connections).

To establish the dialog between the terminal and the computer, the transmission parameters on both devices must be set correctly.

The full range of functions that can be performed in the XBT terminal memory (creation, modification, loading, comparing messages, etc.) are described in the documentation supplied with the XBT-L100 programm.

MESSAGES FOR XBT-B8141 AND XBT-C8251 ARE STORED
WITH XBT-L100 V.1.1 PROGRAMM.

- **The XBT terminal parameters are selected in Configuration Mode** (refer to sub-section 4.1.3 Memory Configuration).

The procedure is:

- Select the type of data link: RS-232C,
- Select the line parameters (baudrate, format, parity and stop bit).

ONLY PARITY EVEN, ODD, NO, SETTINGS ARE ACCEPTED BY
XBT-L100 PROGRAMM.

- Select the dialog mode: CONVERSAT. NO (non-conversational),
- Select acknowledgement: ACK for XBT-B8141 and XBT-C8251, pressing **(ENTER)** displays the message AWAITING MESSAGE. The XBT terminal is ready to receive messages to store.
- **The transmission parameters are selected in the Services Menu** (PC-XBT transfer operation) of the XBT-L100 programm and are set to match those of the XBT terminal used.

WHILE LOADING IS IN PROGRESS, THE XBT TERMINAL
DISPLAYS THE MESSAGE PROG. RUNNING.

Storing Messages with a PC-PS/2 and XBT-L100 Software

• Message transfers

To perform a:

- Transfer from the XBT to PC-PS/2 and PC-PS/2 to XBT,
- Transfer from the XBT to the Printer (via the PC-PS/2),
- Comparison between the XBT and PC-PS/2 messages,

The XBT terminal must be set in and its parameters set in Configuration Mode (refer to sub-section 4.1.2, Line Configuration).

The procedure comprises:

- Transmission mode selection : ASCII mode is required
- Data link type selection : RS-232C is required
- Line parameter selection
(FDX/HDX, BAUDRATE, FORMAT, PARITY and STOP BIT)
- Checksum selection : NO is required
- Response selection : YES or NO

5.5 Storing Messages with a TSX T407 Terminal

A physical link is established from the printer port of the TSX T407 programming terminal (as described in section 8, Connections).

The transmission parameters of the TSX T407 terminal must be set to match those of the XBT terminal in order to establish the dialog.

The line parameters of the XBT terminal can be accessed in Configuration Mode (refer to sub-section 4.1.3, Memory Configuration).

The selection sequence is:

- Select the type of data link, : must be RS-232C
- Select the line parameters (baudrate, format, parity, stop bit),
- Select the dialog mode, : CONVERSAT. NO (not conversational)
- Select the acknowledgement sent by the terminal:
ACKNOWLEDGE MESSAGE (reserved for XBT-B8141 and XBT-C8251),
- The XBT is now ready to receive and store messages.
- The parameters of the TSX T407 programming terminal are set as shown below:

5.5.1 Setting TSX T407 Transmission Parameters

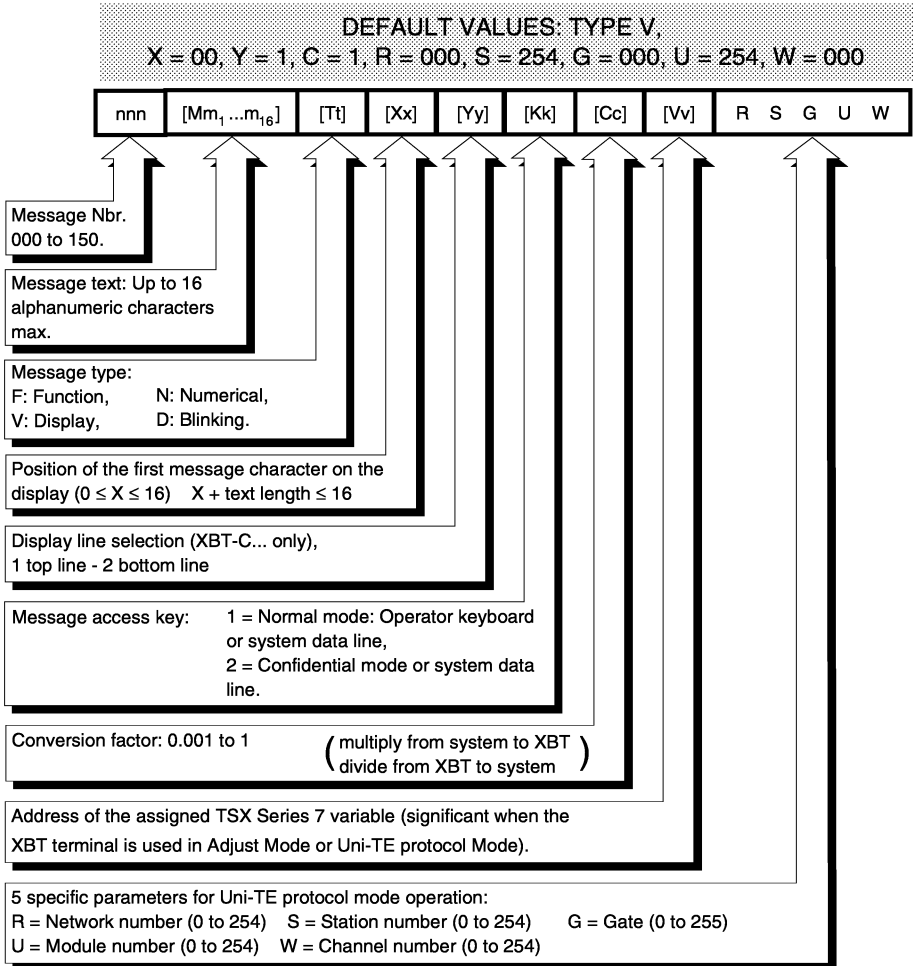
ACTION	TSX T407 DISPLAY	DESCRIPTION
<input type="button" value="ON"/>	**TEST**	
	ADJ PRG DBG TRF HELP ./.	
<input type="button" value="./."/>	NET TER DGN HELP ./.	select TSX T407 terminal mode
<input type="button" value="TER"/>	CNX LIN TST TXT	
<input type="button" value="LIN"/>	BAU PAR STO DAT	
<input type="button" value="BAU"/>	BAUDS : 1200	} example of parameter selection
<input type="button" value="PAR"/>	PARITY EVEN	
<input type="button" value="STO"/>	STOP BIT : 2	
<input type="button" value="DAT"/>	DATA 7 BITS	
<input type="button" value="CLR"/>		
TSX T407 (on-line)	TSX T4071 (off-line)	
<input type="button" value="TXN"/>	<input type="button" value="CNX"/>	connection request (on-line)
<input type="button" value="TXT"/>	<input type="button" value="TXT"/>	
<input type="button" value="GO"/>	<input type="button" value="GO"/>	TSX T407 terminal ready to print message generation
<input type="button" value="..."/>	<input type="button" value="..."/>	
<input type="button" value="PRT"/>	<input type="button" value="PRT"/>	send the message to the XBT-B .../C terminal

Storing Messages with a TSX T407 Terminal

5.5.2 Storage Syntax

The procedure for defining a message and its assigned parameters is the same as that described for the conversational mode (with a Display Terminal). Each parameter is optional and preceded by a specific separator (ampersand character @).

The syntax for a complete message is:



THE SYNTAX ORDER MUST BE APPLIED WHEN STORING THE MESSAGES.

5 Storing Messages

Storing Messages with a TSX T407 Terminal

5.5.3 Sending the Message

The **PRT** key on the TSX T407 terminal generates LF (H'0A') and CR (H'0D) characters.

If a syntax error occurs, the XBT terminal will Beep and send an error message (not displayed by the TSX T407 terminal):

ESC > PROG. ERROR < LF CR

If the entry is correct, the XBT terminal displays the message text.

THE TSX T407 CAN DISPLAY UP TO 24 CHARACTERS PER DISPLAY
LINE.
A MESSAGE WITH A GREATER NUMBER OF CHARACTERS MUST BE
STORED IN MORE THAN ONE PASS WITH THE SAME MESSAGE
NUMBER ENTERED AS THE MESSAGE HEADER.

Example:

@ 3 @ M PRESSURE = - - - B

PRT Send the first part of message 3,

CRL Clear the terminal display,

@ 3 @ T N @ X 5 @ V W 4 0

PRT Send the second part of message 3.

Special case: Clearing a message and its parameters.

Write: @ Message Nbr. @ M @ x 1 6 **PRT**
(the XBT terminal display is cleared).

6.1 General

6.1.1 ASCII Mode

ASCII mode is used when the XBT terminal is connected to a system that is programmed via a serial communication module (e.g.: a TSX SCM 20.. module installed in a TSX Series 7 PLC).

In this type of operation, the transmission settings of the module must be set to match those required by the connected XBT terminal.

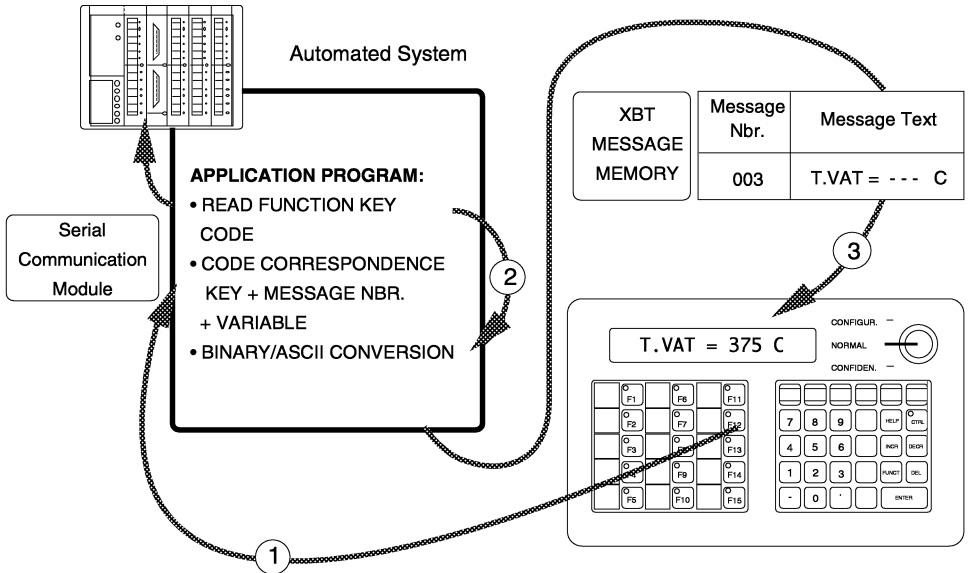
Once messages are stored in the XBT terminal, a link can be established between the message identification number, its text, its type and its parameters.

Exchanges use strings of ASCII characters that are parity checked. The parity check applies to each character. An optional checksum test is performed on the complete message (these checks are selected when the serial data line is configured. Refer to sub-section 4.1.2).

**THE ENTIRE EXCHANGE IS CONTROLLED BY THE
AUTOMATED SYSTEM**

The programming of exchanges with TSX Series 7 PLCs requires the use of text blocks in Ladder or Literal language instructions.

General ASCII Mode



ASCII Mode

- ① Pressing **12** sends an ASCII coded message to the automated system.
- ② The application program performs the necessary processing:
 - reading the key code for key **12**
 - establishment of correspondence between message 003 and the variable
 - Binary/ASCII conversion for sending the command.
- ③ The automated system triggers the display of message 003 with the current value of 375. The value can be modified by the operator if required.

THE AUTOMATED SYSTEM CONTROLS ALL EXCHANGES

**General
ASCII Mode**

Example 1

Message number 021 is stored in the XBT terminal:

T.VAT = - - - C (type V)

Purpose	Display	Exchanges		Description
		XBT	Automated System	
Display an evolving numerical parameter (mesurement)	T.VAT = 126 C	←	ESC V 021 126 LF CR	System request to display message 021 and the current value (126)
	T.VAT = 128 C	←	ESC V 021 128 LF CR	Refresh the value (128)
	T.VAT = 130 C	←	ESC V 021 130 LF CR	Refresh the value (130)

THE AUTOMATED SYSTEM CONTROLS ALL EXCHANGES

Example 2

Message 044 is stored in the XBT terminal:

INSTRUCTION = - - - - (type N)

Purpose Operator action	Display	Exchanges		Description
		XBT	Automated System	
Modify an instruction (F12)			ESC C121 LF CR →	Operator requests access via function key (12)
	INSTRUCTION = 1235	←	ESC R 044 1235 LF CR	System requests display of message 044 with blinking display of the value 1235 (awaiting an operator response).
(DEL) + (DEL)	INSTRUCTION = 12- -			Clears the digits to be modified
(4) + (0) + (ENT)	INSTRUCTION = 1240		ESC R 1240 LF CR →	Entry and transmission to the system of the modified value (1240).

THE AUTOMATED SYSTEM CONTROLS ALL EXCHANGES

6 Communication

General ASCII Mode



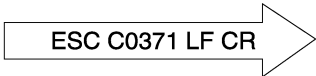
Description of Type F (FUNCTION)

Enables, on request from the automated system, transmission of an operator request (key number).

THE REQUEST IS A TYPE F MESSAGE WITH A TYPE R COMMAND
THE RESPONSE IS A KEY NUMBER

Example:

with stored message 053 COLOR = - - TF

Display	Exchanges XBT Automated System	Description
<code>COLOR = - -</code> (dashes blink)	 ESC R053 LF CR	Request operator response to message 053
<code>COLOR = - -</code>	 ESC C0111 LF CR	Operator response by pressing function key 11
	or	or
<code>COLOR = 37</code>	 ESC C0371 LF CR	Operator response by pressing 3 + 7 + ENTER

General

6.1.2 Adjust Mode

The Adjust mode is used when an XBT terminal is connected to the programming port of a TSX Series 7 PLC.

Once messages are stored in the XBT terminal, a link can be established between the message identification number, its text, type, parameters, a TSX 7 PLC variable and a function key (within the limits of addressing).

If no variables are defined, the function key has the same function as in the ASCII mode.

OPERATOR INITIATED EXCHANGES ARE TRANSPARENT TO THE APPLICATION PROGRAM

The selection of a function by the operator will trigger:

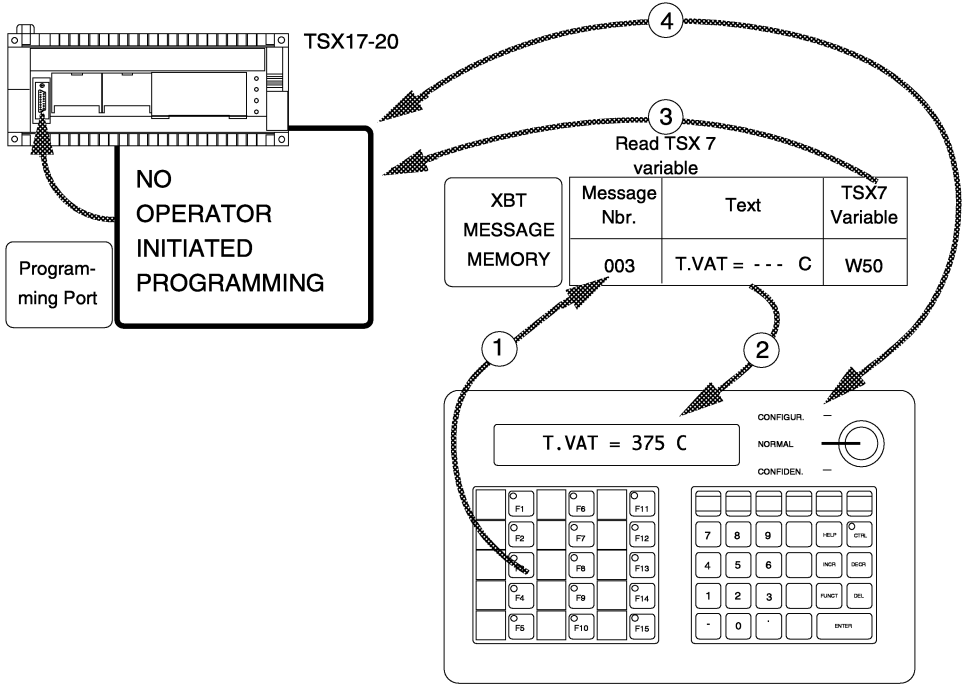
- Display of the corresponding text,
- Direct access to the PLC variable, without affecting the application program.

Access to PLC variables is selective, with multiple levels:

- Only those variables assigned to a message stored in the terminal can be displayed,
- These variables can only be modified if provision for an operator response was made when the message was stored (message with a type N numerical response or a type F function key response),
- The software access code defined when the message was stored enables the variables to be modified in Normal mode (1 = Norm.) or in Confidential mode (2 = Confid.).

WHEN INITIATED BY THE AUTOMATED SYSTEM, COMMANDS ARE PERFORMED AS IN ASCII MODE.

**General
Adjust Mode**



Adjust Mode

- ① Pressing function key **③** triggers access to message number 003.
- ② The message is displayed: (T. VAT = - - - C)
- ③ The XBT accesses the assigned PLC variable (W50) and displays its value (375).
- ④ This value can be modified, if required, by the operator.

NO OPERATOR INITIATED PROGRAMMING

**General
Adjust Mode**

- Example**
- Message number 021 is stored in the XBT terminal:
T.VAT = - - - C (declared as type V and assigned to TSX7 variable W50)
 - Message number 012 is stored in the XBT terminal:
INSTRUCTION = - - - C (declared as type N and assigned to variable W113).

Purpose	XBT TERMINAL	EXCHANGES		DESCRIPTION
	DISPLAY KEYS	XBT	TSX7	
Display an evolving numerical parameter (measurement)	T.VAT = 126 C	← ESC V 021 LF CR		TSX7 request to display message 021. the value of word W50 is automatically inserted in the response field.
	T.VAT = 127 C			The XBT terminal will cyclically retrieve the value of word W50, and display it, performing ASCII to Binary conversion.
	T.VAT = 128 C			
WHEN INITIATED BY THE TSX SERIES 7 PLC, COMMAND PROGRAMMING IS IDENTICAL TO ASCII MODE				
Modification of an instruction value	F12	INSTRUCTION = 123C		Request for operator access to message 012 (linked to function key <u>12</u>). The XBT terminal automatically <ul style="list-style-type: none"> • Displays message nbr. 12 • Acquires the value of word W113.
	DEL + DEL	INSTRUCTION = 1 - - C		Operator deletes the modified characters.
	3 + 4 ENTER	INSTRUCTION = 134C		Enter and validate the new value. The XBT terminal automatically stores value 134 in word W113.
NO OPERATOR INITIATED PROGRAMMING				
IN ADJUST MODE: CONVERSIONS BETWEEN BINARY AND ASCII AND VICE VERSA ARE PERFORMED AUTOMATICALLY				

General
Adjust Mode**• Description of Type F (FUNCTION) Assigned to a Bit**

- **Operation:** Pressing a function key will display the message assigned to it and sets the TSX 7 bit to 1 once. Releasing the key clears the message from the screen and resets the TSX 7 bit to 0.

• Specific Features

- Numerical values have signs (TSX 7 words). They are displayed as shown below:
 - . positive values: the + sign is not displayed (space),
 - . negative values: the - sign is displayed.
- To handle constant TSX 7 text block formats, it is possible to include in the commands one or more NUL (00H) commands.

• Type F Description (FUNCTION) Assigned to a Word

Selection of preset messages: these enable the appropriate response to be sent on request from the operator (or the PLC) to pressing a key.

The request is a type F message with a word variable. The response is:

- the key (0 to 15 or 0 to 30) assigned to a type V message without a variable.
- a number entered in the numerical field (≥ 16 or ≥ 31).

The response number is stored in a type F message word.

**General
Adjust Mode**

• **Example**

Stored messages { 003 COLOR = - - TF VW10 :
(declared as type F with variable word W10)
011 BLACK TV X07 } must be declared as type V
012 BLUE TV X07 without a variable
013 RED TV X07 the X shift makes room for a
047 GREEN TV X07 response

DISPLAY	EXCHANGES		DESCRIPTION
	XBT	TSX7	
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">COLOR = - -</div> (dash blinks)			REQUEST for a response to message 003 by the operator: by pressing 3
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">COLOR = - -</div> (dash blinks)	<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 10px;">ESC R003 LF CR</div>		by the PLC
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">COLOR = BLACK</div>			Operator response by pressing 11 (the value 11 is stored in word W10)
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">COLOR = GREEN</div>			by pressing 4 + 7 + ENTER (the value 13 is stored in word W10)

General

6.1.3 Uni-TE Protocol

• Operating line configuration

Using the Uni-TE protocol, the following parameters are set:

- Type of data link : RS-485
- Type of exchange : Half Duplex
- Line parameters : 8-bit Format

The following parameters:

- Number of stop bits : 1 or 2
- Transmission speed : 110, 300, 600, 1200, 2400, 4800, 9600, 19200
- Parity : even, odd, none, space, mark
- Checksum : yes or no
- Response : yes or no

must be defined in Uni-TE line configuration mode
(see sub-section 4.1.2).

Use Uni-TE mode to define the complete address of the automatic text block (Network nbr., Station nbr., Gate nbr., Module nbr., Channel nbr.) that will receive command ESC C xxx LF CR generated when a function key with no assigned key is programmed.

General Uni-TE Protocol

- **Uni-TE Protocol (XBT-B8.../XBT-C8...)**

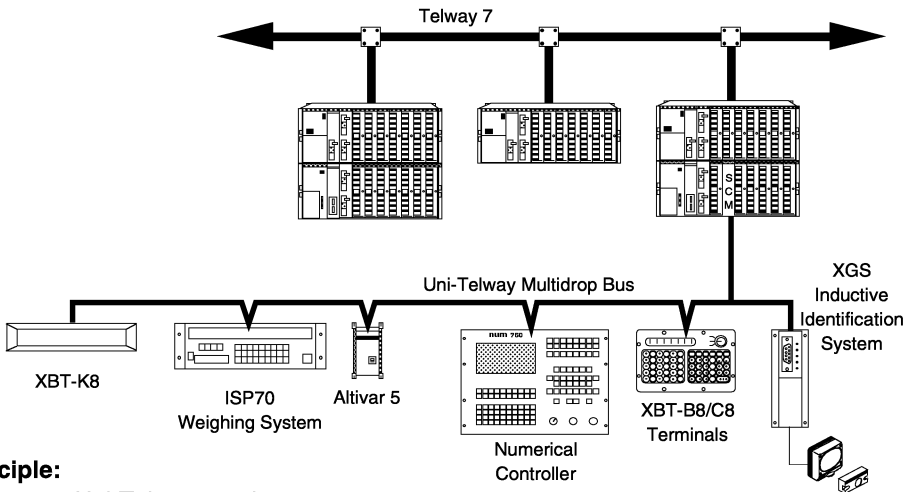
THE UNI-TE PROTOCOL IS SUPPORTED BY
XBT-B8... AND XBT-C8... TERMINALS

- **Definition:**

UNI-TE is the application layer of the Uni-Telway industrial communication protocol.

- **Presentation:**

The Uni-Telway industrial multipoint bus is the standard means of communication between various automation devices supplied by Telemecanique and/or other vendors (supervision, computer systems, etc.). It meets OSI model physical, data link and application layers specifications.



- **Principle:**

Uni-Telway requires:

- At data link level: a fixed Master that controls and checks the exchanges,
- At application level: 1 to 27 Slave devices that can be Clients or Servers (independently of their status for the data link layer).

A Client sends Requests to a Slave,
The Server responds to Requests from the Client.

General

XBT-B8/C8 Uni-Telway

• XBT-B8/C8 Uni-Telway

- XBT-B8.../C8... terminals support all of the functions available in Adjust mode, with the following advantages:
 - Availability of the TSX 7 programming port,
 - Multipoint operation with other connected devices,
 - Access to data objects in remote devices via Telway 7 or Uni-Telway as XBT-B8.../C8... terminals handle the five Uni-Telway addressing parameters:

Network number	000 by default
Station number	254 by default
Gate number	000 by default
Module number	254 by default
Channel number	000 by default

The network number and station number bytes are used to identify devices connected to the Telway 7 network.

REFER TO THE UNI-TELWAY BUS REFERENCE MANUAL
TSX D24004E.

- XBT-B8.../C8... Status:
 - At data link layer level, XBT-B8.../C8... terminals are Slaves,
 - At application layer level, XBT-B8.../C8... terminals can be Clients or Servers.

XBT CLIENT:
THERE IS NO APPLICATION PROGRAM IN THE SERVERS.

XBT SERVER:
REQUESTS ARE PROGRAMMED IN THE CLIENTS.

General
XBT-B8/C8 Uni-Telway

• **Operating Modes**

• **CLIENT XBT:**

REQUESTS SUPPORTED BY XBT AS CLIENT	
TYPE	XBT FUNCTION
<p>ACCESS TO DATA</p> <p>(read/write bits and words from connected devices)</p>	<p>FUNCTION KEYS</p> <p>(assigned to the messages stored in the XBT terminal with Uni-Telway addressing)</p>

Storage of messages in the XBT terminal defines:

- A correspondence between a message number and a function key number (within the limits of the defined addressing),
- The type of dialog (the type of message F, V, N, D and the assigned variable),
- The address of the Server device (Network, Station, Gate, Module, Channel number).

Pressing function keys assigned to XBT terminal messages will, transparently to the application:

- Display the message text,
- Send a read (type V, D, N messages) and write (type F, N messages) request for the variable.

NO OPERATOR INITIATED PROGRAMMING.

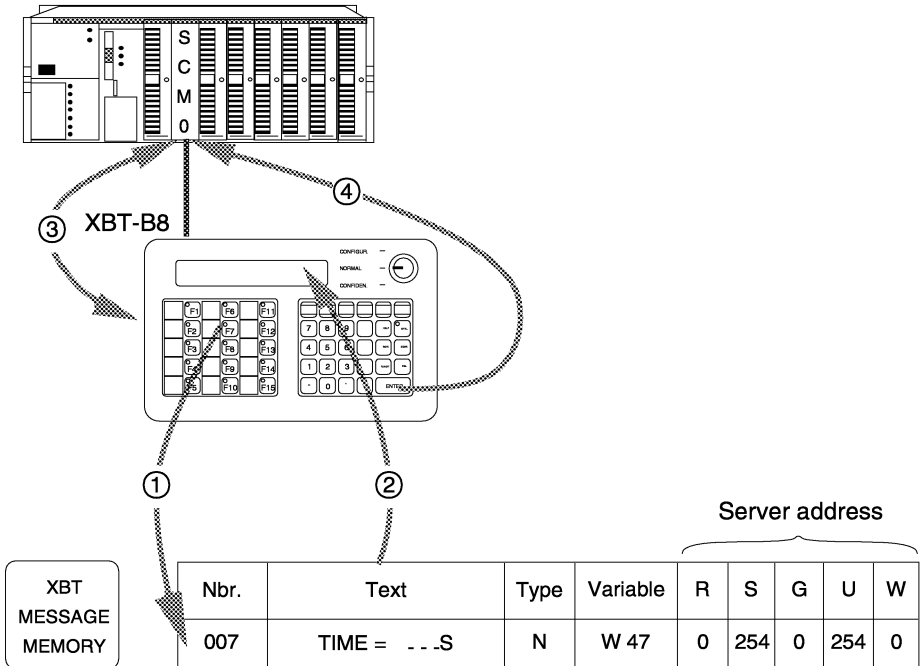
Note: Only variables assigned to a message stored in the terminal can be displayed.

- Modifying these variables is only possible if an operator response was allowed when the message was stored (message with type N numerical response or type F function key response),
- The access key defined when the message was stored enables modification of the variables in Normal mode (1 = Norm.) or in Confidential mode only (2 = Confid.),
- The Target Server is a TSX Series 7 PLC that is Master or a Slave on the Uni Telway bus or can be accessed via Telway 7.

General XBT-B8/C8 Uni-Telway

• Client XBT Example

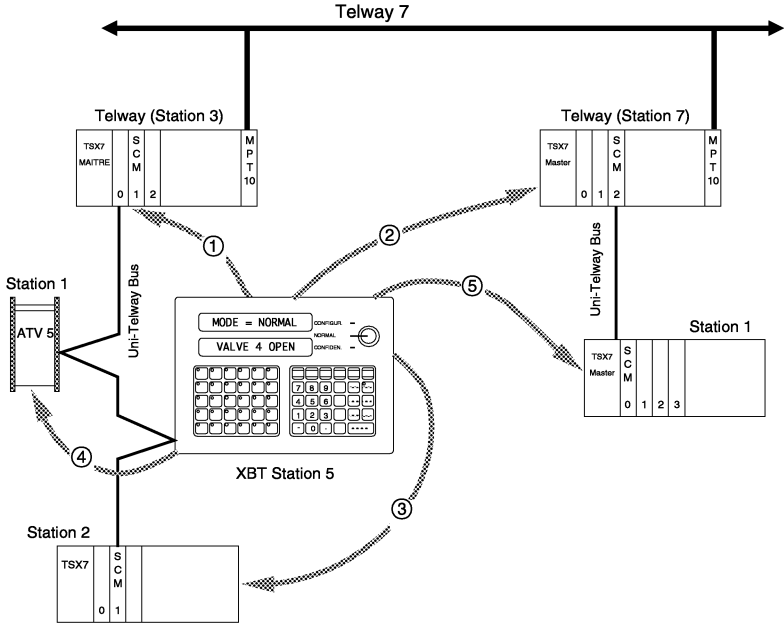
- Modifying an instruction:



- ① Pressing function key **(7)** triggers access to message nbr. 007.
- ② Message text displayed
- ③ The XBT terminal reads and displays the value of variable W47 of the PLC defined by the parameters (R = 0, S = 254, G = 0, U = 254, W = 0) entered when the messages were programmed.
- ④ The new value is written by the operator (validated by pressing **(ENTER)**) in variable W47.

General
XBT-B8/C8 Uni-Telway

• **Client XBT: Server Addressing Examples**



PURPOSE	SERVER	XBT-C8 CLIENT MESSAGES									
		Nbr.	TEXT	TYPE	SERVER DEVICE VARIABLE	SERVER ADDRESS					
						R	S	G	U	W	
①	DISPLAY	Local TSX7 Master	003	TIME = . . . S	V	W139	0	3	0	254	0
②	DISPLAY	Remote TSX7 Master (via Telway 7)	004	NUMBER = . . . P	V	CW216	0	7	0	254	0
③	CONTROL	Local TSX7 Slave	007	RUN	F	B48	0	3	5	0	102
④	ADJUST	Local ATV 5 Slave	008	SPEED =	N	W197	0	3	5	0	101
⑤	ADJUST	Remote TSX7 Master (via Telway 7)	015	VAL = . . .	N	W1023	0	7	5	2	101

WHEN REQUESTED BY THE OPERATOR, THE XBT TERMINAL SENDS READ AND WRITE REQUESTS DIRECTLY TO THE SYSTEM GATE OF THE PLC

General XBT-B8/C8 Uni-Telway

• Server XBT:

- Most of the functions of the Server require the use of ASCII ESC LF CR commands sent by the PLC to the XBT terminal.

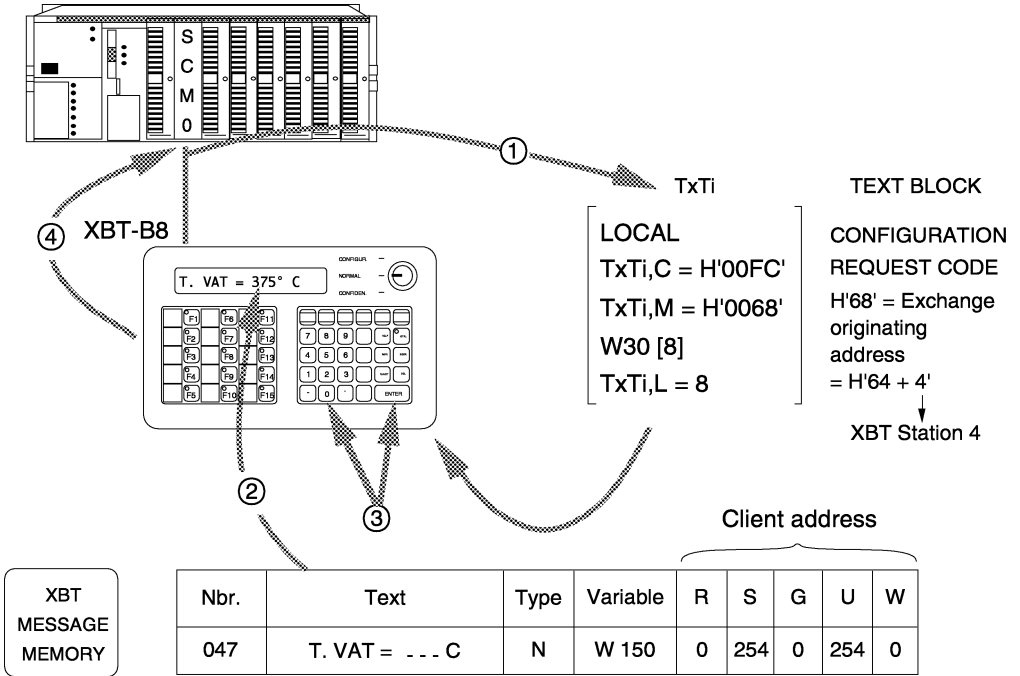
REQUESTS SUPPORTED BY XBT TERMINAL AS SERVER	
TYPE	XBT FUNCTIONS
GENERAL USAGE	* IDENTIFICATION PROTOCOL VERSION STATUS MIRROR
OPERATING MODES	* INITIALIZATION SELF-TEST
UNSOLICITED DATA	BUZZER (on/off) LEDs and INDICATORS (on/off/blinking) FUNCTION KEYS (lock/unlock)
	MESSAGES (display)

- * These requests (described in sub-section 10.1, Appendix), are essentially used for controlling the Uni-Telway bus.
- A sender device requests access to XBT terminal services by sending TSX Series 7 text blocks with:
 - Standard requests for general usage and operating modes,
 - Request H'FC' for unsolicited data.

General XBT-B8/C8 Uni-Telway

• Server XBT Example

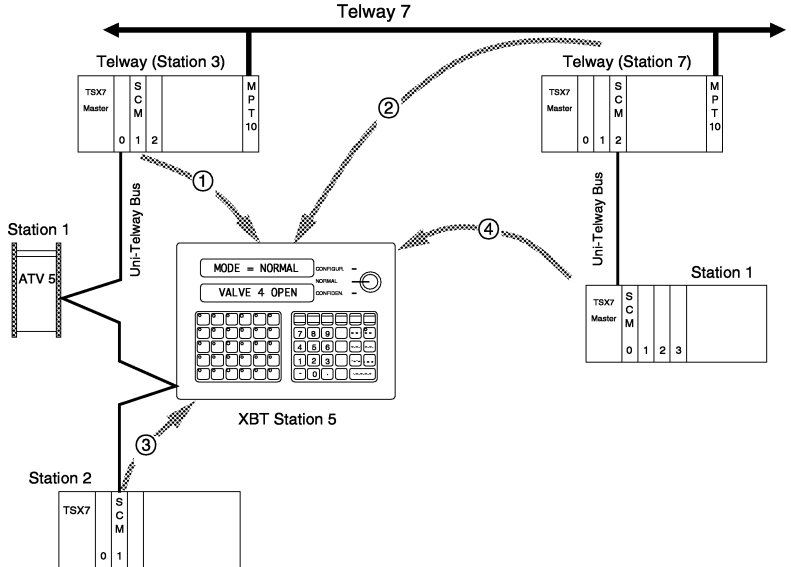
- Modifying an instruction (request from the Master):



- ① The Client device requests display of message 047 (stored in the XBT terminal) with an operator response by sending command ESC R 047 [LF] CR (see sub-section 6.5.9).
- ② Display the text of message 047 with the numerical value stored in the variable assigned to (W 150) in the Client device.
- ③ The operator enters the new value from the keyboard and validates the entry by pressing **ENTER**
- ④ The XBT terminal writes the value 375 to W 150 and returns ESC R 047 [LF] CR (acknowledgement).

General XBT-B8/C8 Uni-Telway

• Server XBT: Addressing Examples



PURPOSE	SENDER	SENDER TEXT BLOCK (Request H'FC')																														
		TYPE	ADDRESS	TABLES																												
① Close the relay	Local TSX7 Master	LOCAL OUTPUT	XBT SERVER TxTi, M = H'0069'	TRANS.	<table border="1"> <tr><td>S</td><td>ESC</td></tr> <tr><td>CR</td><td>1</td></tr> </table>	S	ESC	CR	1																							
S	ESC																															
CR	1																															
② Display message 115	Remote TSX7 Master	NET	XBT SERVER TxTi, M = H'0069'	TRANS.	<table border="1"> <tr><td>V</td><td>ESC</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>CR</td><td>5</td></tr> </table>	V	ESC	1	1	CR	5																					
V	ESC																															
1	1																															
CR	5																															
③ Request terminal status	Local TSX7 Slave	LOCAL EXCHG	SCM CLIENT APP. ADDRESS (AD1) TxTi, M = H'0167'	<table border="1"> <tr><td colspan="2">TRANS.</td><td colspan="2">RECEPTION</td></tr> <tr><td></td><td></td><td>E</td><td>ESC</td></tr> <tr><td></td><td></td><td>0</td><td>1</td></tr> <tr><td></td><td></td><td>0</td><td>0</td></tr> <tr><td>E</td><td>ESC</td><td>CR</td><td>LF</td></tr> <tr><td>CR</td><td>LF</td><td></td><td></td></tr> </table>	TRANS.		RECEPTION				E	ESC			0	1			0	0	E	ESC	CR	LF	CR	LF						
TRANS.		RECEPTION																														
		E	ESC																													
		0	1																													
		0	0																													
E	ESC	CR	LF																													
CR	LF																															
④ Display message 29 (with a response)	Remote TSX7 Slave	LOCAL EXCHG	SCM CLIENT APP. ADDRESS (AD1) TxTi, M = H'0066'	<table border="1"> <tr><td colspan="2">TRANS.</td><td colspan="2">RECEPTION</td></tr> <tr><td>H'00'</td><td>H'00'</td><td>R</td><td>ESC</td></tr> <tr><td>H'5'</td><td>H'3'</td><td>2</td><td>0</td></tr> <tr><td>H'69'</td><td>H'0'</td><td>LF</td><td>9</td></tr> <tr><td>R</td><td>ESC</td><td></td><td>CR</td></tr> <tr><td>2</td><td>0</td><td></td><td></td></tr> <tr><td>CR</td><td>9</td><td></td><td></td></tr> </table>	TRANS.		RECEPTION		H'00'	H'00'	R	ESC	H'5'	H'3'	2	0	H'69'	H'0'	LF	9	R	ESC		CR	2	0			CR	9		
TRANS.		RECEPTION																														
H'00'	H'00'	R	ESC																													
H'5'	H'3'	2	0																													
H'69'	H'0'	LF	9																													
R	ESC		CR																													
2	0																															
CR	9																															

- With some PLCs, the first character of the response may be an ASCII "BELL" (H'07) character: in this case, start analysis of the response from the second byte.

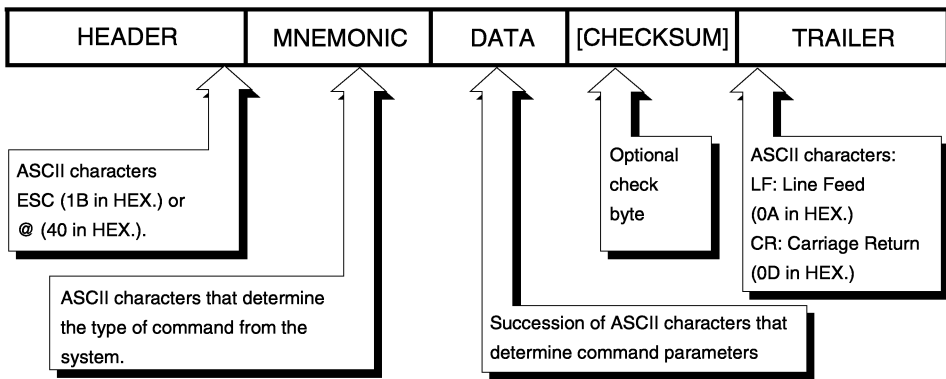
FOR FURTHER INFORMATION ON THE PROGRAMMING AND CONFIGURATION OF TEXT BLOCKS, REFER TO THE PROGRAMMING DOCUMENTATION FOR TSX SERIES 7 PLCs.

6.2 Exchange Format

This sub-section describes the format of exchanges between the XBT terminal and the automated system, over the serial link.

The exchanges determine the operations required in the application program.

These comprise a succession of ASCII characters with the following structure:



Example: ESC R037 4327 LF CR

Only those exchanges that start with ESC or @ are analyzed by the XBT terminal.

Exchanges are bidirectional.

Therefore, this sub-section will cover:

- Commands sent from the PLC to the terminal,
- Transmissions from the terminal to the PLC.

IN THE COMMAND DESCRIPTIONS, PARAMETERS SHOWN IN SQUARE BRACKETS [] ARE OPTIONAL.

SPACES ARE SHOWN BETWEEN CHARACTERS FOR CLARITY, THEY SHOULD NOT BE INCLUDED IN COMMANDS

ALL SYNTAX RULES MUST BE RESPECTED

(Refer to sub-section 5.2, Syntax).

A COMMAND APPLIED TO AN XBT MEMORY ADDRESS WITHOUT A MESSAGE CAUSES THE DISPLAY OF:

XXX: NO MESSAGE (XXX = message number)

6.3 Summary of Commands and Transmissions

FUNCTION	COMMAND PLC → XBT	TRANSMISSION XBT → PLC	NOTES
BUZZER	B.	/	
LEDS	C.	/	
FUNCTION KEY CODES	/	C.	
TERMINAL STATUS	E.	E.	
LOCK FUNCTION KEYS	F.	F.	
ACKNOWLEDGEMENT	/	F.	
CLOCK-CALENDAR	H.	H.	XBT-C....
READ THE TEXT OF A MESSAGE	L.	L.	
READ THE TRANSMISSION REGISTER	Q.	LAST MESSAGE SENT	
DISPLAY PREVIOUSLY STORED MESSAGES AND AWAIT AN OPERATOR RESPONSE	R.	R.	
RELAY	S.	/	XBT-C....
DISPLAY A MESSAGE THAT WAS NOT STORED	T.	R IF TYPE N MESSAGE	
DISPLAY A STORED MESSAGE	V.	/	
CANCEL OPERATION IN PROGRESS	Z.	Z.	
STATUS MESSAGE TRANSMISSION FAULT ON THE MESSAGE RECEIVED	/	@	Check parity checksum
STATUS MESSAGE COMMAND SYNTAX ERROR	/	?	Access to the question is impossible Access code = 2
STATUS MESSAGE TERMINAL NOT READY	/	\$	Await operator response Full memory buffer
STATUS MESSAGE VALIDATE, NO CHANGE TRANSMISSION REGISTER CLEAR	/	#	Message sent if "response yes" selected.
STATUS MESSAGE ON-LINE PRINTER FAULT	/	!	XBT-B8141 XBT-C8251

6.4 Summary of Printer Line Commands

LINE COMMANDS SPECIFIC TO XBT-B8141 AND XBT-C8251

No printing is performed if "no print" is selected in the printer configuration. No storage is performed if "no log" is selected in the printer configuration. The table below shows the access made, depending on the attribute added (if any) to commands R,T,V,H,E,Z. Commands E and Z are special cases and are described later in this sub-section.

PRINTER LINE CONFIGURATION	ATTRIB.	DESCRIPTION
AUTO. PRINT AUTO. LOG	no attrib. @G @GP @GH @GD	access to printer, log and display access to printer, log and display access to printer access to log access to display
AUTO. PRINT TRIG. LOG	no attrib. @G @GP @GH @GD	access to printer and display access to printer, log and display access to printer access to log access to display
TRIG. PRINT AUTO. LOG	no attrib. @G @GP @GH @GD	access to log and display access to printer, log and display access to printer access to log access to display
TRIG. PRINT TRIG. LOG	no attrib. @G @GP @GH @GD	access to display access to printer, log and display access to printer access to log access to display

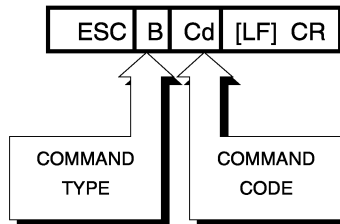
IN ALL OPERATING MODES, OPERATOR DIALOG FUNCTIONS ARE RETAINED.

6.5 System to XBT Commands

6.5.1 Buzzer Command **B**

• **Function:** starts or stops the alarm buzzer.

• **Syntax:**



cd = 0 ESC B 0 [LF] CR stop buzzer

THE BUZZER CAN ALSO BE STOPPED BY PRESSING **ENTER** OR ONE OF THE FUNCTION KEYS AND THE **HELP** KEY, IF THEY HAVE NOT BEEN LOCKED OUT.

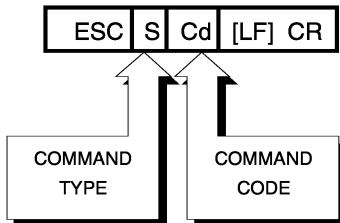
cd = 1 **DEFAULT VALUE**

ESC B [LF] CR buzzer on

6.5.2 Relay Command **S**

• **Function:** close or open the relay.

• **Syntax:**



cd = 0 ESC S 0 [LF] CR open relay

cd = 1 **DEFAULT VALUE**

ESC S [LF] CR close relay

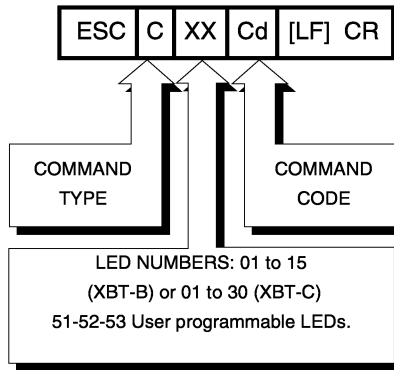
System to XBT Commands

6.5.3 LED Command C

- **Function** commands the function key LEDs individually or together.

ON POWER-UP, ALL LEDES ARE EXTINGUISHED

- **Overall command syntax:**

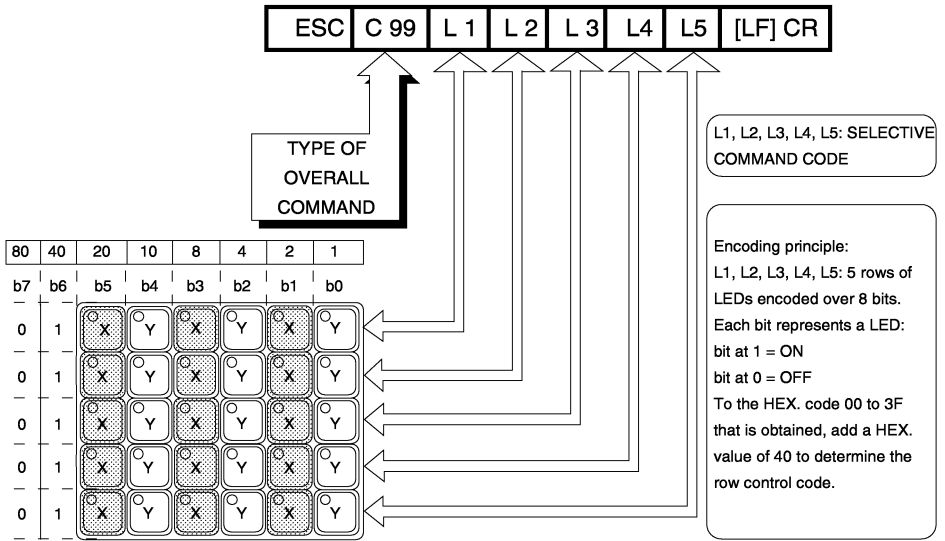


- cd = 0 ESC C XX 0 [LF] CR extinguish LED XX
example: ESC C 12 0 [LF] CR extinguish LED 12
- cd = 1 DEFAULT VALUE
 ESC C XX 1 [LF] CR light LED XX
example: ESC 0 7 [LF] CR light LED 7
- cd = 9 ESC C XX 9 [LF] CR light and blink LED XX
example: ESC C 11 9 [LF] CR light and blink LED 11

- **Example:**
 Light user LED 2, blinking
 command to send: ESC C 52 9 [LF] CR

System to XBT Commands
LED Command

• Overall and selective command syntax



BITS b0 TO b7 FORM THE ASCII CHARACTER OF THE COMMAND CODE.

• Definition of variables X and Y

15-key keyboard		30-key keyboard	
X	Always 0	X	0 → OFF 1 → ON
Y	0 → OFF 1 → ON	Y	0 → OFF 1 → ON

THIS COMMAND DOES NOT SUPPORT BLINKING.

System to XBT Commands
LED Command

Overall command: When no selective command code is present, an overall LED ON command is generated.

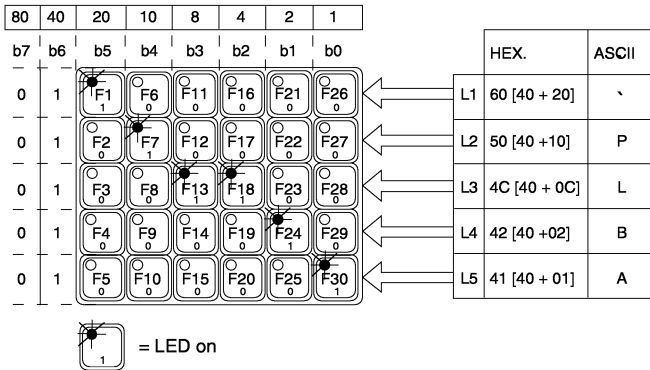
• **Examples:**

- Light function key LEDs
 command to send: ESC C 99 [LF] CR
- Extinguish function key LEDs
 command to send: ESC C 99 0 [LF] CR

Selective command:

• **Example:**

on a 30-key keyboard (XBT-C ...) light the LEDs in function keys F1, F7, F13, F18, F24, F30, extinguish other LEDs.



(H' 40' → force bit b6 to 1)

Command to send
 ESC C 99 ` PLBA [LF] CR

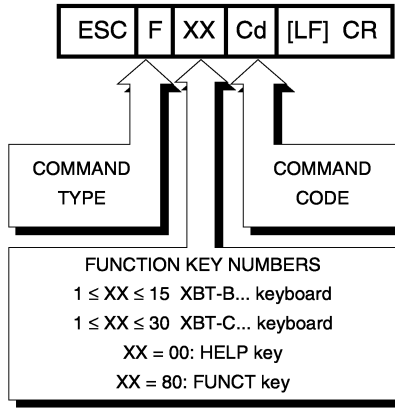
System to XBT Commands

6.5.4 Function Key Command **F**

Function: Controls the locking or unlocking of function keys, individually or together.

ON POWER-UP, ALL FUNCTION KEYS ARE UNLOCKED

• Individual control syntax:



IN NORMAL MODE:
 LOCKING THE FUNCT KEY INHIBITS INDIRECT
 ACCESS (MESSAGES 16 TO 99 FOR XBT-B
 OR 31 TO 99 FOR XBT-C.).

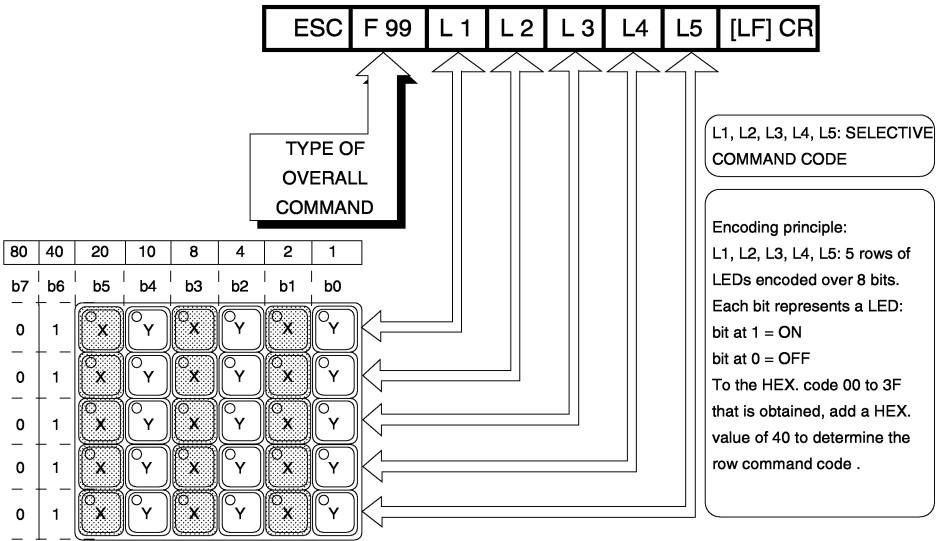
THE HELP KEY CAN BE USED
 AS FUNCTION KEY 00.

cd = 0 ESC F XX 0 [LF] CR locks function key XX
Example: ESC F 0 9 0 [LF] CR locks function key 9.

cd = 1 DEFAULT VALUE:
 ESC F XX 1 [LF] CR unlocks function key XX
Example: ESC F 80 [LF] CR unlocks the FUNCT key

**System to XBT Commands
Function Key Command**

• Overall and selective command syntax



BITS b0 TO b7 FORM THE ASCII CHARACTER OF THE COMMAND CODE.

• Definition of variables X and Y

	15-key keyboard		30-key keyboard
X	always 0	X 0	→ LOCK
		X 1	→ UNLOCK
Y	0 → LOCK	Y 0	→ LOCK
Y	1 → UNLOCK	Y 1	→ UNLOCK

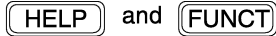
System to XBT Commands

Function Key Command

- **Overall command:** When no selective unlock command is sent, an overall unlock command is sent.

- **Examples:**

- lock all function keys including keys



Command to send:

ESC F 99 0 [LF] CR

- Unlock all keys

DEFAULT VALUE = 1

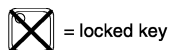
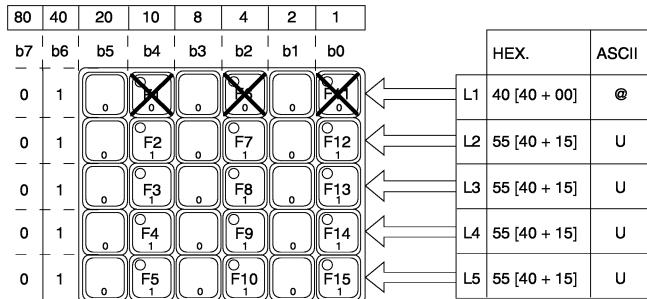
Command to send:

ESC F 99 [LF] CR

- **Selective command:**

- **Example:** XBT-B ...

Lock keys F1, F6, F11, on a 15-key keyboard (XBT-B ...)

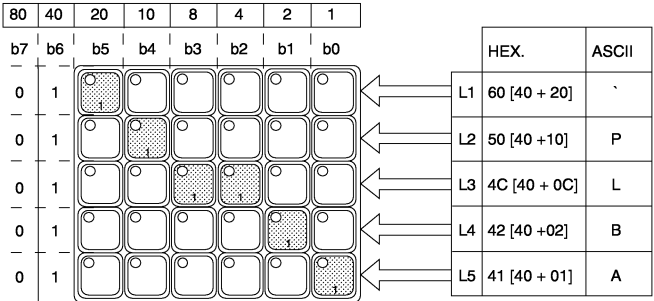


Commands to send:

ESC F 99 @ U U U U [LF] CR

System to XBT Commands
Function Key Command

- **Example: XBT-C ...**
 Unlock keys F1, F7, F13, F18, F24, F30.



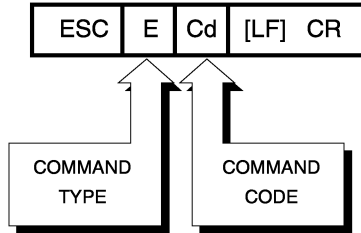
Command to send:
 ESC F 99 ` PL BA [LF] CR

System to XBT Commands

6.5.5 Read Terminal Status **E**

• **Functions:** Displays the position of the key switch (Normal or Confidential) and the position of the relay (for XBT-C).

• **Syntax:**



ON RECEPTION OF THIS COMMAND, THE XBT TERMINAL SENDS ITS RESPONSE (Refer to 6.6.2).

cd = ESC E [LF] CR: the absence of a command code triggers reading without display of terminal status.

• **Functions specific to XBT-B8141 and XBT-C8251 terminals:**

• **REQUEST PRINTER STATUS**

Cd = @ GP

Syntax:

ESC	E	@ GP	[LF] CR
-----	---	------	---------

• **REQUEST TRENDING MEMORY STATUS**
(number of slots available)

Cd = @ GH

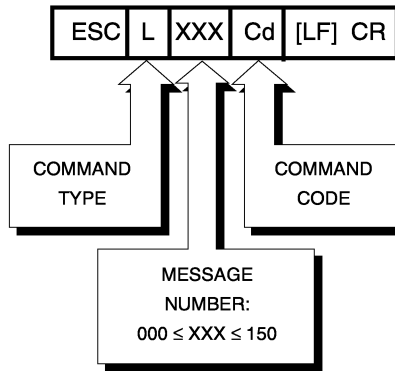
Syntax:

ESC	E	@ GH	[LF] CR
-----	---	------	---------

System to XBT Commands

6.5.6 Read a Message L

- **Function:** Read a stored message or the display buffer.
- **Syntax:**



cd = 0 DEFAULT VALUE ESC L XXX [LF] CR
 Read the text of message number XXX,

cd = 1 ESC L XXX 1 [LF] CR complete read of a message (number, text and parameters),

cd = 2 ESC L XXX 2 [LF] CR read the test of message number XXX, followed by the time and date for XBT terminals equipped with a Clock/Calendar function (XBT-C ...).

IN ADJUST MODE WITH UNI-TE PROTOCOL
 ONLY cd = 0 IS ALLOWED:
 RECEPTION OF UP TO 30 CHARACTERS MAX. (TEXT BLOCK).

System to XBT Commands

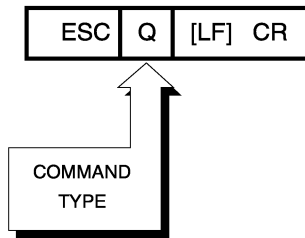
6.5.7 Read the Transmission Register Q

- **Function:** Read the last transmission made by the terminal.

- . **Point-to-point:** read the last transmission except for #, \$, @ and ?

- . **Multipoint:** the contents of the register is only sent on reception of the command ESC A XX Q [LF] CR (XX: terminal address, refer to sub-section 6.7, ASCII Multipoint Operation).

- **Syntax:**

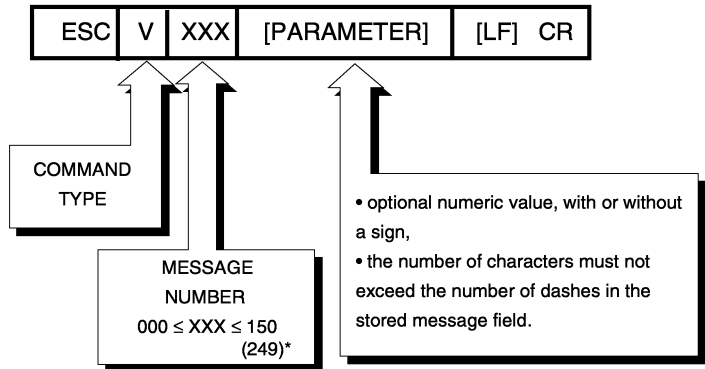


System to XBT Commands

6.5.8 Display a Stored Message (without response) **V**

- **Function:** Display a stored message
- . **TYPE V or N message:** No operator response expected - the message is displayed permanently
- . **TYPE D message:** The message is displayed blinking - operator acknowledgement is performed by pressing **ENTER** (the message is permanently displayed).

• **Syntax:**



• **Example:**

Display message 025 AUTO RUN (type V)

Command: ESC V 025 LF CR

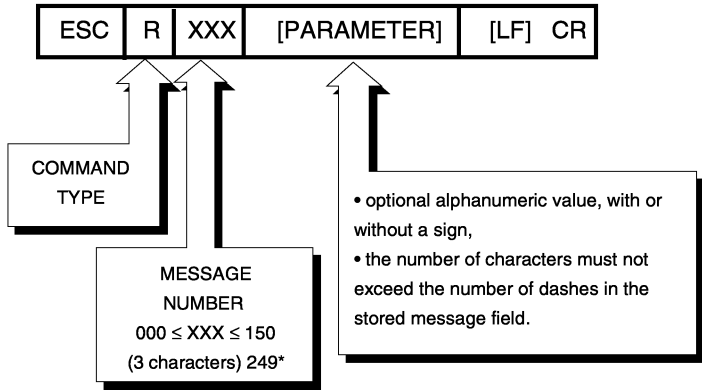
Display: AUTO RUN

* For XBT-B8141 and XBT-C8251 Terminals

System to XBT Commands

6.5.9 Display a Stored Message (with response) **R**

- **Function:** Display a TYPE N stored message with a request for operator acknowledgement: while waiting for the response, the parameters field blinks and LED 6 lights until the operator validates the response by pressing **ENTER**.

• **Syntax:**• **Examples:**

- Display message 025 and await an operator response.
Message defined as type N
Command: ESC R 025 [LF] CR
- Display message 025 with a signed current value + 128 displayed blinking in the numerical field.
Command: ESC R 025 + 128 [LF] CR
The value can be changed using the Edit keys **DEL** **INCR** **DECR** and the Number keys.

The modified value is validated and sent after pressing **ENTER**

* For XBT-B8141 and XBT-C8251 terminals.

System to XBT Commands Display a Stored Message (with response)

Summary of XBT terminal responses to an R command.

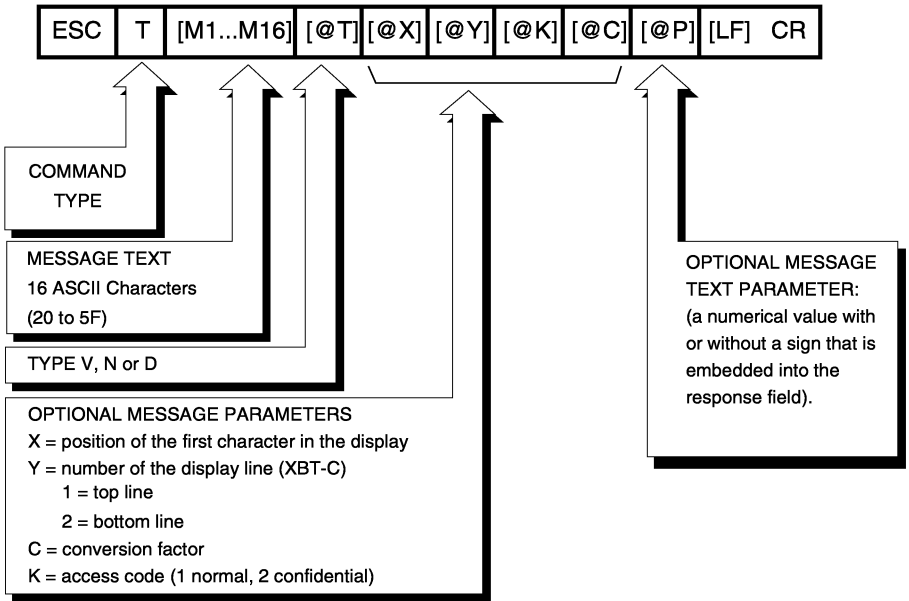
XXX: is the message number, yyy: is the value

COMMAND		OPERATOR RESPONSE	XBT TRANSMISSION (IF RESPONSE WITH)
ASCII	ESC R XXX [LF] CR	ENTER on blank field	ESC # LFCR
	ESC R XXX yyy [LF] CR	ENTER no change	ESC R yyy LFCR
	ESC R XXX yyy [LF] CR	ENTER changed	ESC R yyz LFCR
ADJUST	ESC R XXX [LF] CR	ENTER no change	ESC R XXX LFCR (value of the TSX 7 variable is unchanged)
	ESC R XXX [LF] CR	ENTER changed	ESC R XXX LFCR (value of the TSX 7 variable is changed)
	ESC R XXX yyy [LF] CR	ENTER no change	ESC R yyy LFCR (value of the possible TSX 7 variable is unchanged)
	ESC R XXX yyy [LF] CR	ENTER changed	ESC R yyz LFCR (value of the possible TSX 7 variable is changed)

System to XBT Commands

6.5.10 Display a Non-Stored Message T

- **Function:** Display with operator response request (type N message) or without operator response request (type V or D messages) a message not stored in the XBT terminal.
- **Syntax:** The @ (ARROBAS) is used as the parameter separator for this command.



DEFAULT VALUE	T	X	Y	K	C
	V	00	01	1	1

- XBT-B** COMMAND ESC T [LF] CR CLEARS THE DISPLAY
- XBT-C** COMMAND ESC T @ Y1 [LF] CR CLEARS TOP LINE
COMMAND ESC T @ Y2 [LF] CR CLEARS BOTTOM LINE

System to XBT Commands Display a Non-Stored Message

- **Example 1:** Display a message (without waiting for an operator response),
Command: ESC T TIME = - - - - @TV@P35788 [LF] CR
Display:
- **Example 2:** Display a message (with parameters),
Command: ESC T WEIGHT = - - - - KG@TV@X03@C0.5@P549 [LF] CR
Display:
- **Example 3:** Display a message (with parameters) and request an operator response,
Command: ESC T TIME = - - - - S@TN@X01@P3452 [LF] CR
Display: (3452 blinks and LED 6 is lit),
Transmission: ESC R 3455 LF CR (the value was changed to 3455 and validated by pressing).
- **Example 4:** Display a blinking message,
Command: ESC T NEED PARTS @TD [LF] CR
Display: (blinking)
Transmission: ESC F 255 LF CR acknowledged by pressing
- **Example 5:** Display a blinking message (with parameters)
Command: ESC T OVERSPEED = - - - @TD@P345 [LF] CR
Display: (blinking)
Transmission: ESC F 255 LF CR acknowledged by pressing

Note:

If a blinking message is displayed, the system can be informed of the operator acknowledgement.

To do so, use the transmission from the XBT terminal to the PLC of ESC F255 [LF] CR.

System to XBT Commands

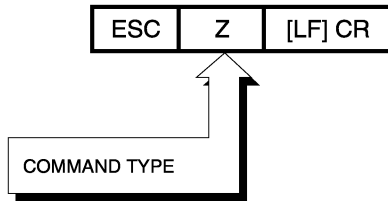
6.5.11 Cancel Operations in Progress Z

- **Functions:** Enables release of the terminal (extinguish the displays, extinguish LED 6 indicating an operator response request). The terminal cancels all of the operations in progress and displays its operating mode (Normal or Confidential).

Procedures in progress can be:

- Awaiting an operator response to a type R command,
- An unacknowledged blinking message.

- **Syntax:**



FUNCTIONS SPECIFIC TO XBT-B8141 AND XBT-C8251 TERMINALS

- Clear the content of the log memory:

Syntax:

ESC	Z	@ G	H	[LF] CR
-----	---	-----	---	---------

- Clear the printer buffer:

Syntax:

ESC	Z	@ G	P	[LF] CR
-----	---	-----	---	---------

ON RECEPTION OF THIS COMMAND
THE XBT TERMINAL SENDS ITS RESPONSE (refer to 6.6.7)

PLC COMMANDS, PRECEDED BY ESC Z [LF] CR,
HAVE PRIORITY OVER THE
TERMINAL STATUS

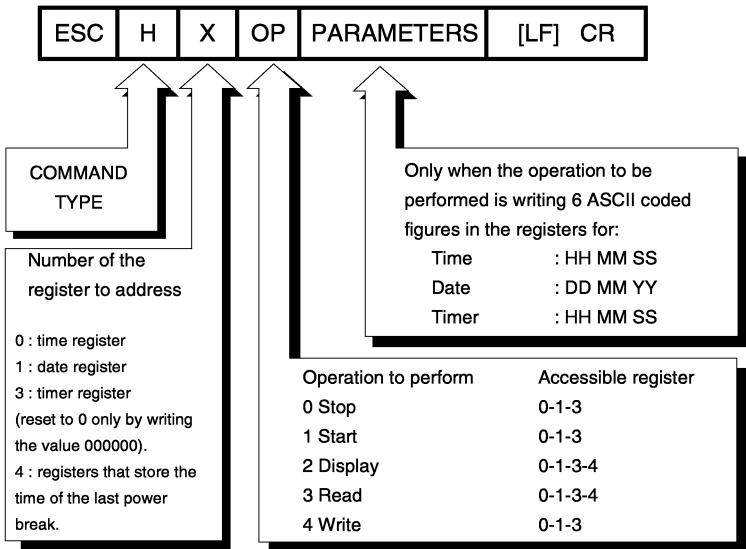
System to XBT Commands

6.5.12 Clock/Calendar Commands H

This command is only active for XBT-C ... terminals

- **Functions:** Enables access to the various Clock/Calendar registers in Read, Write, Display, Start, Stop modes.

- **Syntax:**



System to XBT Commands
Clock/Calendar Commands

- **Example 1:** Display the time

Command: ESC H 02 [LF] CR

Display:

TIME	11 = 01 = 37
------	--------------

- **Example 2:** Read the duration of the last power break.

Command: ESC H 43 [LF] CR

The terminal sends the duration of the last power failure.

Example: ESC H 0003 51 56 LF CR

(or 3 hours, 51 minutes, 56 seconds)

- **Example 3:** Reset the timer register

- Command: ESC H 3400 00 00 [LF] CR

- **Example 4:** Start the timer

- Command: ESC H 31 [LF] CR

Note: Systematic timer reset is recommended before use.

System to XBT Commands

6.5.13 Specific XBT-B8141 and XBT-C8251 Terminal Commands

• **Automatic display copy**

Function: Printing and storing in the log (if Auto. Log is selected) each time the contents of the display are changed.

• **Example 1:** Type V message.

Display a message not stored in the XBT terminal (without an operator response).

Command: ESC T PRESSURE = - - - @TV@X0@P100 [LF] CR

Display: PRESSURE = 100

Printer or Log: PRESSURE = 100

Command: ESC T 285@TV@X10 [LF] CR

Display: PRESSURE = 285

Printer or Log: PRESSURE = 285

ONLY THE MESSAGE TEXT IS COPIED

• **Example 2:** Type D message (blinking)

Display message 160 stored in the XBT terminal.

Command: ESC V 160 [LF] CR

Display: FAULT PUMP N1 blinking

Printer or Log: FAULT PUMP N1

Operator response ENTER

Display: FAULT PUMP N1 fixed

Printer or Log: FAULT PUMP N1

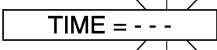
THE COPY IS MADE WHEN THE FAULT MESSAGE APPEARS AND
THE OPERATOR RESPONDS BY PRESSING ENTER

System to XBT Commands**Specific XBT-B8141 and XBT-C8251 Terminal Commands****Automatic display copy (contd)**





- **Example 3:** Type N message with operator response request.

Display message 18 stored in the XBT terminal.

Command: ESC R 018 [LF] CR

Display:  response field blinks

Printer or Log: TIME INSTRUCTION = - - -

Operator response:  +  +  + 

Display:  fixed

Printer or Log: TIME INSTRUCTION = 123

THE COPY TAKES PLACE WHEN THE NUMERICAL DISPLAY
MESSAGE APPEARS AND WHEN THE OPERATOR RESPONSE IS
VALIDATED

System to XBT Commands Specific XBT-B8141 and XBT-C8251 Terminal Commands

- **"Triggered" display copy**

Function: Displays and copies the display to the printer (if in the Configur. Line Printer selection Print Auto. or Print Trig. was selected). The display can also be copied to the log memory (if in the Configuration menu, Log Auto. or Log Trig. were selected). This applies to any message stored or not stored in the XBT terminal, with or without an operator response.

- **Example 1:** Display and "Triggered" copy of message 001 stored in the XBT terminal (without operator response).

Command syntax: ESC V 001 @ G [LF] CR.

- **Example 2:** Display and "Triggered" copy of message 002 stored in the XBT terminal (without operator response).

Command syntax: ESC R 002 @ G [LF] CR.

THE OPERATOR RESPONSE IS INCLUDED IN THE PRINT OUT
AND/OR IN THE TREND MEMORY STORAGE.

- **Example 3:** Display and "Triggered" copy of a message not stored in the XBT terminal (type V, N or D messages).

Command syntax: (type N message)

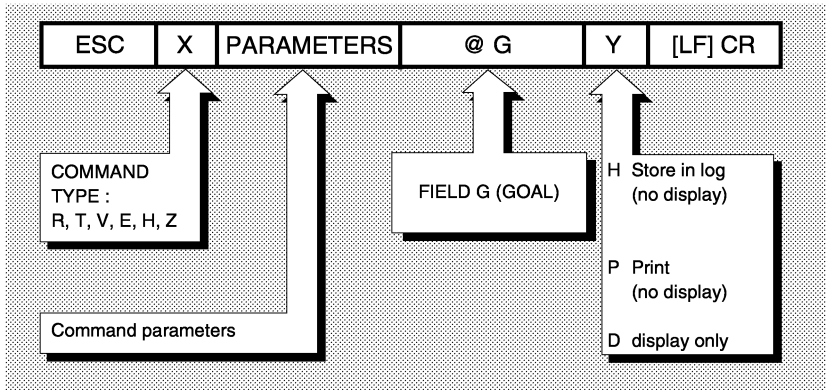
ESC T PRESSURE = - - @ T N @ G [LF] CR

TRIGGERED DISPLAY COPY CAN ONLY BE INITIATED BY THE
SYSTEM.
OPERATOR REQUESTS ARE NOT PRINTED.

System to XBT Commands**Specific XBT-B8141 and XBT-C8251 Terminal Commands**• **"Transparent" copy**

Function: This operating mode enables access to the three terminal resources:

- Display
- Printer
- Log

Syntax:

A "TRANSPARENT" COPY CAN ONLY BE MADE TO A SINGLE RESOURCE BY EACH COMMAND.

"TRANSPARENT" PRINTING IS PERFORMED IF THE PRINTER LINE IS CONFIGURED FOR "PRINT AUTO. OR PRINT TRIG. " MODES. AN APPLICATION "TRANSPARENT" COPY IS MADE TO THE TREND MEMORY IF THE PRINTER LINE IS CONFIGURED FOR "LOG AUTO. OR LOG TRIG." MODES.

System to XBT Commands Specific XBT-B8141 and XBT-C8251 Terminal Commands

"Transparent" copy (contd)

- **Example 1:** Transparent copy to Log of a message not stored in the XBT terminal (no display).

Command: ESC T HUMIDITY @ G H

On reception of this command, the XBT terminal will store the message text (HUMIDITY) in the Log memory without display or print-out.

- **Example 2:** Transparent printing of a type V message stored in the XBT terminal.

Command: ESC V 009 @ G P

Print-out: CYCLE IN PROGRES.


The text of message 009 is printed without being displayed or stored in the Log memory.

- **Example 3:** Display a type N message stored in the XBT terminal with a request for operator response.

Command: ESC R011 @ G D

Display message 011 stored without copying into the Log memory and without user transparent printing.

Display :




Modification of the value:

Operator action:



Display:

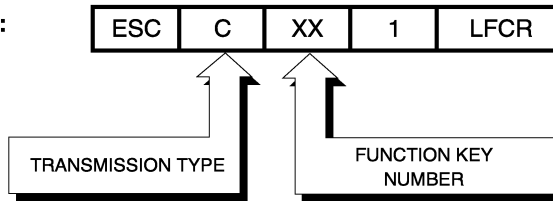
 (fixed display)

6.6 XBT to System Commands

6.6.1 Function Keys C

- **Function:** Send function key codes:
 - direct access keys 01 to 15 (or 30 for XBT-C)
 - indirect access keys 16 (or 31) to 99.

- **Syntax:**



Direct access function keys:

$xx = 0$ HELP key

$01 \leq xx \leq 15$ XBT-B keys

$01 \leq xx \leq 30$ XBT-C keys

- **Example 1:** Transmission sent by the XBT terminal after pressing function key 8:

ESC C 081 LF CR

Indirect access function codes:

$16 \leq xx \leq 99$ for XBT-B

$31 \leq xx \leq 99$ for XBT-C

- **Example 2:** Transmission sent by the XBT terminal after pressing:

FUNCT + 8 + 4 + ENTER

Indirect access to function code key 84:

ESC C 841 LF CR

XBT to System Commands

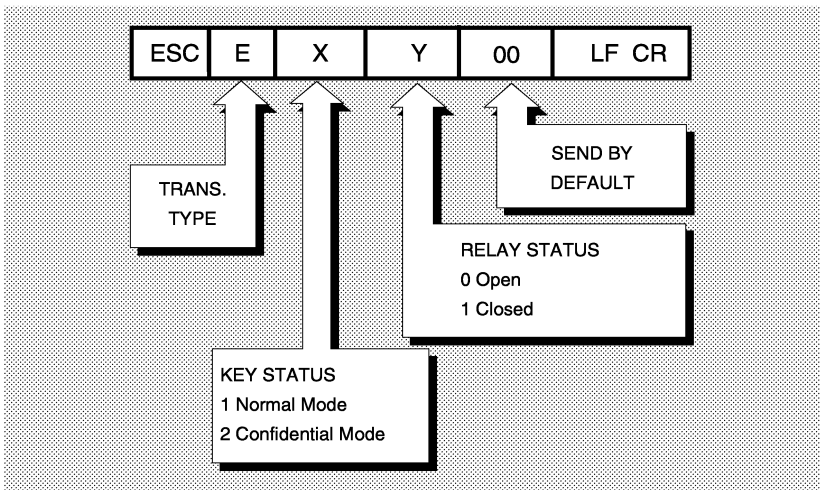
6.6.2 Terminal or Printer Status E

- **Functions:** Send the terminal status (keyswitch and relay status). For XBT-B8141 and -C8251, terminals, transmission of printer status and message log status.

- **Terminal status**

RESPONSE TO COMMAND ESC E [LF] CR
(terminal status request)

- **Syntax:**



- **Read the terminal status**

Example: ESC E 11 00 [LF] CR
means that the terminal is in Normal mode with the relay closed.

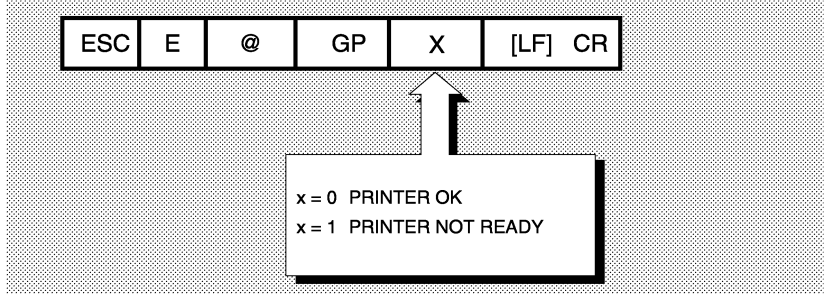
XBT to System Commands

Terminal or Printer Status

• Printer status

RESPONSE TO COMMAND ESC E @ GP [LF] CR
(request printer status)

Syntax:

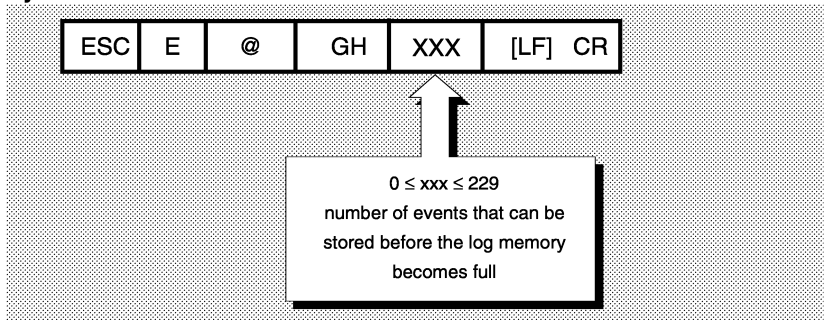


Example: ESC E @ GP 0 [LF] CR
means printer on-line and ready.

• Log status

RESPONSE TO COMMAND ESC E @ GH [LF] CR
(request log status).

Syntax:



Example: ESC E @ GH 124 [LF] CR
means that 124 message locations remain free in the log memory.

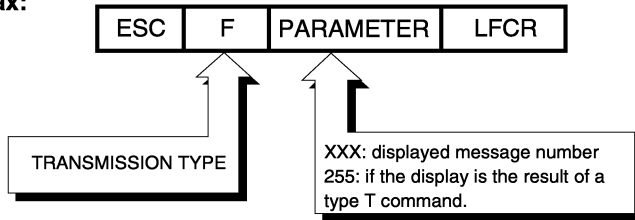
XBT to System Commands

6.6.3 Acknowledgement

- **Function:** acknowledge a message (declared as type D) by pressing the **ENTER** key, RESPONSE TO COMMAND V.

If the terminal is selected in RESPONSE YES mode, the transmission performed takes the form:

- **Syntax:**

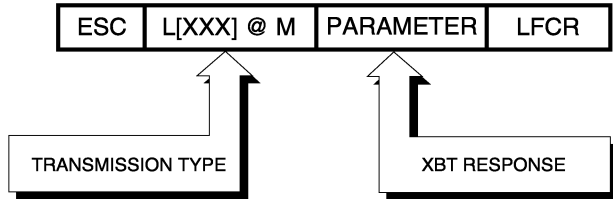


XBT to System Commands

6.6.4 Message or Display Buffer Content **L**

• **Function:** Sends a stored message: RESPONSE TO COMMAND L.

• **Syntax:** The @ (ARROBAS) is used as the parameter separator in this transmission.



• **Read message text** (16 ASCII characters max.)

Command: ESC L049 [LF] CR (read message 049)

Transmission: ESC L049@M VALUE = - - - - - C LF CR (send the text of message 049).

• **Read a complete message** (text and parameters)

Command: ESC L0491 [LF] CR (read message 049).

Transmission: ESC L049@M VALUE = - - - - - C@TN@X2@Y1@ K1@ C1@V W 00100 LF CR (transmission of message 049 with all of its parameters).

• **Read the text of a message with the time** (for XBT-C)

Command: ESC L0492 [LF] CR (read the text of message 049 followed by the time).

Transmission: ESC L049@M VALUE = - - - - - C124515 (send the text of message 49 followed by the time: 12 hours 45 minutes 15 seconds).

XBT to System Commands

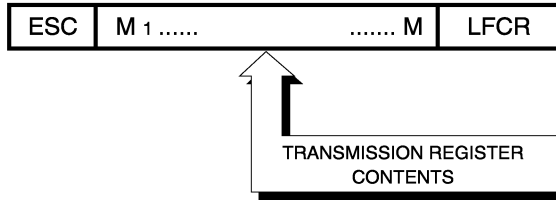
6.6.5 Transmission Register Content Q

- **Function:** Transmits the contents of the transmission register (last message sent): RESPONSE TO COMMAND Q

Usage:

- synchronization of exchanges with the system (repeat the last transmission).
- multipoint mode dialog (refer to sub-section 6.7, ASCII Multipoint Operation)

• **Syntax:**



• **Example:**

Command: ESC Q [LF]CR

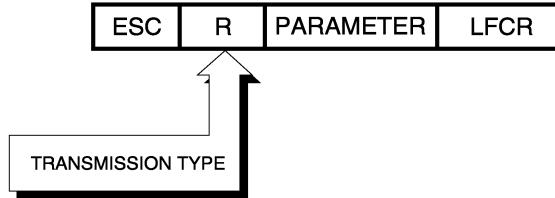
Transmission: ESC R 4839 LF CR (transmission of the last message sent: response 4839).

XBT to System Commands

6.6.6 Numerical Response R

- **Function:** Transmission of a numerical response.
RESPONSE TO COMMANDS R or T.

- **Syntax:**



Example 1: Transmission of a response with a type N stored message.

Command: ESC R 035 [LF] CR (request response to message 035)

Transmission: ESC R 6477 LF CR (send response 6477)

Example 2: Transmission of a response with a non-stored message.

Command: ESC T PRESSURE = - - BAR@TN LFCR

Transmission: ESC R 3.8 LF CR (send response 3.8)

6.6.7 Cancel (response to a type Z command)

- **Function:** echo the cancellation request
RESPONSE TO COMMAND Z

- **Syntax:** ESC Z LF CR

Specific XBT-B8151 and XBT-C8251 terminal functions:

ACKNOWLEDGE CLEARING THE PRINTER BUFFER

Syntax: ESC Z @G P [LF] CR

ACKNOWLEDGE CLEARING THE LOG BUFFER

Syntax: ESC Z @G H [LF] CR

XBT to System Commands

6.6.8 Status Messages

• **Function:** transmission fault on the message received by the terminal (parity or checksum error detection).

• **Syntax:**

• **Function:**

• command syntax error

examples: . ESC V06 [LF] CR
. ESC N012 [LF] CR

• unable to execute the command

examples: . command ESC R on type V or D messages
. command on absent message number
. access to the message nbr. is impossible (access code = 2)

• **Syntax:**

• **Function:** The terminal is not ready (awaiting an operator response or acknowledgement).

• **Syntax:**

• **Function:** The transmission register of the terminal is empty. The message will only be sent if "Response Yes" is selected.

• **Syntax:**

• **Function:** On-line printer fault

• **Syntax:**

6.7 ASCII Multipoint Operation

- **Principles**

Multipoint operation implies that a number of terminals share the same transmission line.

A Master station controls the exchanges by successively polling all of the addressed Slave stations.

The following combinations can be used:

DATA LINK SELECTION	MULTIPOINT CONNECTION		EXCHANGE	MAX. NBR. OF STATIONS
	SERIAL	PARALLEL		
RS-232				
RS-422	NO	YES	HALF	9
RS-485 *	NO	YES	HALF	15
PASS. CL	YES	NO	HALF	15*
BLK. CL	NO	YES	HALF	15*

Connections are described in Section 8.

* Logical limit (addressing): 15 stations

Physical limit: refer to the table for current loop multipoint data links (Section 8).

ASCII Multipoint Operation

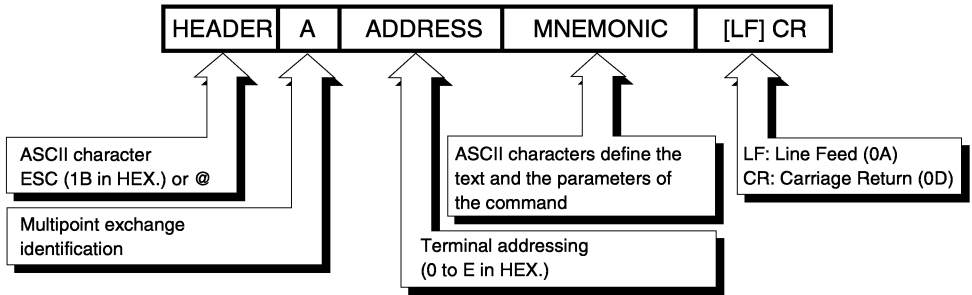
The addressing of the devices is selected by wiring the serial connector as shown in the table below:

ADDRESSES	DEC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
	HEX.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
pin 14 B0 (1)		X		X		X		X		X		X		X		X
pin 15 B1 (2)		X	X			X	X			X	X			X	X	
pin 16 B2 (4)		X	X	X	X					X	X	X	X			
pin 17 B3 (8)		X	X	X	X	X	X	X	X							

X = jumper fitted between pin 8 (COM.) and the selected pins (B0, B1, B2, B3). The multipoint address is read by the XBT terminal each time it is powered-up.

• Multipoint command syntax:

The general command format is therefore:



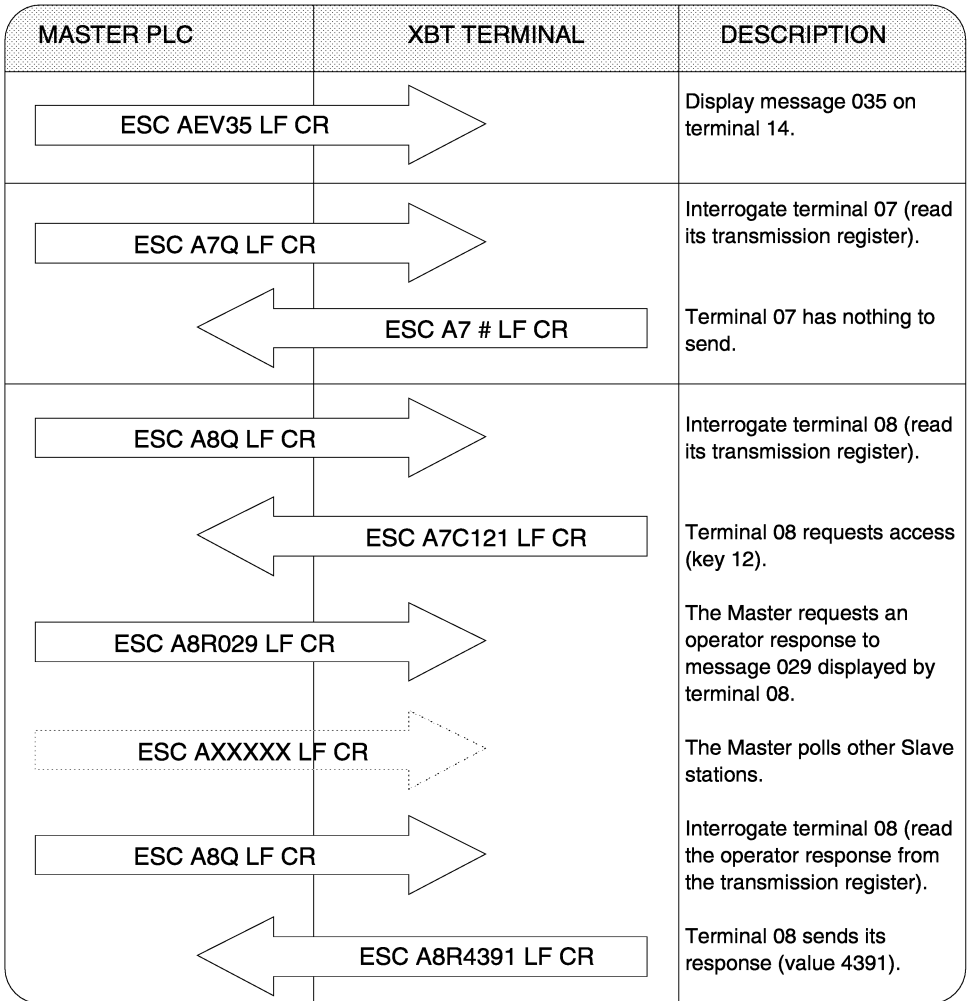
MULTIPOINT ADDRESS F: ALL TERMINALS ACCEPT THE COMMAND BUT SEND NOTHING BACK ON THE LINE (BROADCAST PRINCIPLE)

ASCII Multipoint Operation

• **Operation:**

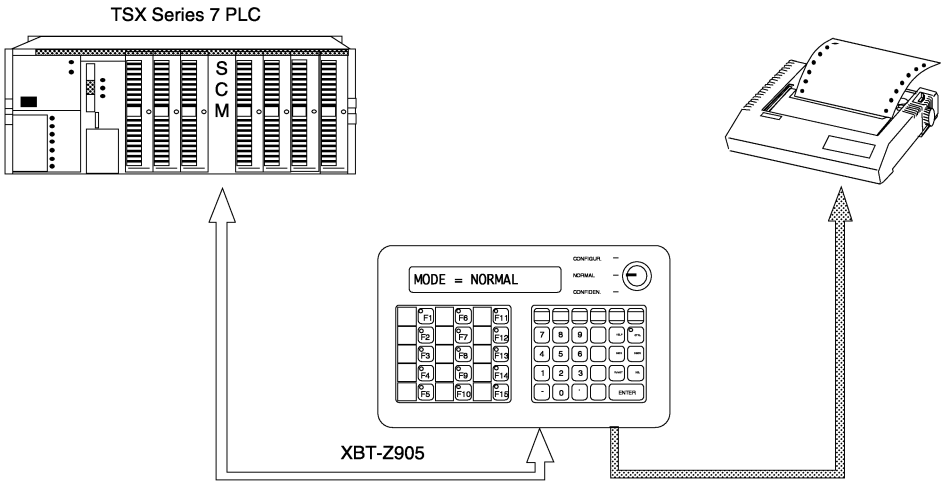
- The Master PLC sends messages on the line.
- Only the terminal where the address sent by the Master PLC corresponds to the address set in the connector will be allowed to send the message that it has prepared in its transmission register. This is cleared after transmission.

• **Dialog example:**



7.1 Using the XBT Terminal in ASCII Mode

• Hardware configurations



- The XBT terminal is connected to a TSX SCM 2• serial communication module via an XBT-Z905 cable (using an RS-232 data link).
- If an XBT-B8141 or XBT-C8251 terminal is used, a printer can be connected (using an XBT-Z935 or 934 cable, refer to section 8).

• PLC and Module Configuration:

The exchanges between the XBT terminal and TSX Series 7 PLCs in ASCII mode are performed via a TSX SCM 2• serial communication module.

Text blocks are used to enable the user program to exchange data as required.

Text blocks need to be configured: set the request codes and the formats of the transmission/reception tables of the selected request.

Note: For more information on the use of text blocks, refer to TSX Series 7 product documentation.

Using the XBT Terminal in ASCII Mode

- Using PLC objects
- Reserving constant words (CW)

TSX SCM 20 module configuration

Constant words	HEX.
CW 0	H' 0811'
CW 1	H' 9600'
CW 2	H' 0000'
CW 3	H' 0000'
CW 4	H' 1100'
CW 5	H' 0D00'

Half duplex, 8 Data bits, Odd parity, 1 Stop bit.
 9600 Baud
 No transmission echo
 No reception echo
 End of reception character
 CR

- PLC to XBT command

Constant words	ASCII	HEX.
CW 34	-	00 08
CW 35	R ESC	52 1B
CW 36	0 0	30 30
CW 37	+ 1	2B 31
CW 38	CR 0	0D 30
CW 20	V ESC	56 1B
CW 21	0 0	30 30
CW 22	@ 2	40 32
CW 23	P G	50 47
CW 24	CR	00 0D
CW 25	V ESC	56 1B
CW 26	0 0	30 30
CW 27	@ 3	40 33
CW 28	H G	48 47
CW 29	CR	00 0D

Number of characters to receive in text block 1
 Display command for message 1 stored in the XBT terminal (awaiting an operator response).

If XBT-B8141 or XBT-C8251
 Request to print message 002 stored in the XBT terminal.

Request to store the log in RAM for message 003 stored in the XBT terminal.

- XBT terminal message memory

PRINT MESSAGES							
Nbr	X	Y	Message text	T	K	Coef	Var.
000	00	1		V	1	1	#
001	00	1	TEMP= _ _ _	N	1	1	#
002	00	1	OVER HEAT	D	1	1	#
003	00	2	STOP MACHINE	V	1	1	#

7 Application Examples

Using the XBT Terminal in ASCII Mode

• Principle of exchanges between XBT and automated system.

OPERATOR RESPONSE	DISPLAY	EXCHANGES XBT ↔ SYSTEM	DESCRIPTION
Press F1		ESC C011 LF CR →	Request operator access via function key F1 (message received in text block reception table 1).
	TEMP = + 0---	← ESC R001 + 0 [LF]CR	System request to display message 001 with the signed value and a blinking 0 (awaiting operator response) (message sent from text block 2).
DEL	TEMP = + ---		Clear the digits to be modified.
1 + 2 + 3 ENTER	TEMP = + 123	→ ESC R001 + 123 [LF]CR	Enter and send the modified value (+123) to the PLC.

PRINTER FUNCTIONS

Print OVER HEAT	← ESC V002 @ GP CR	Setting bit 8 to 1 will trigger "transparent" printing (without displaying or storing the log in memory) for type V message 002 stored in the XBT.
Store in the log RAM STOP MACHINE	← ESC V003 @ GH CR	and "transparent" storage of the log in memory (without display or transmission) of type V message 003 stored in the XBT memory.

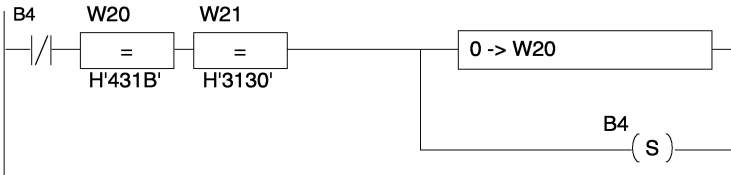
THE SYSTEM CHECKS ALL EXCHANGES

7 Application Examples

Using the XBT Terminal in ASCII Mode

• Principle of exchanges between XBT and system

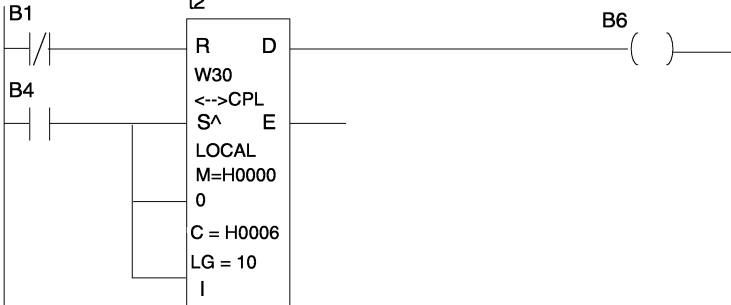
LABEL: 50



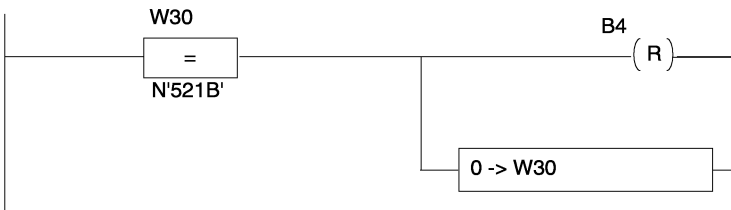
LABEL: 60

"XBT SENDS"

t2



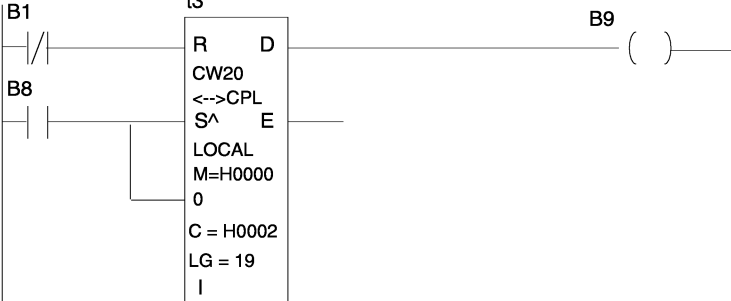
LABEL: 70



LABEL: 80

If XBT with printer support

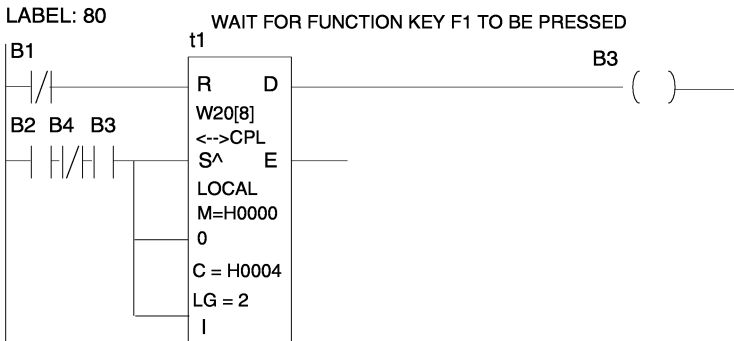
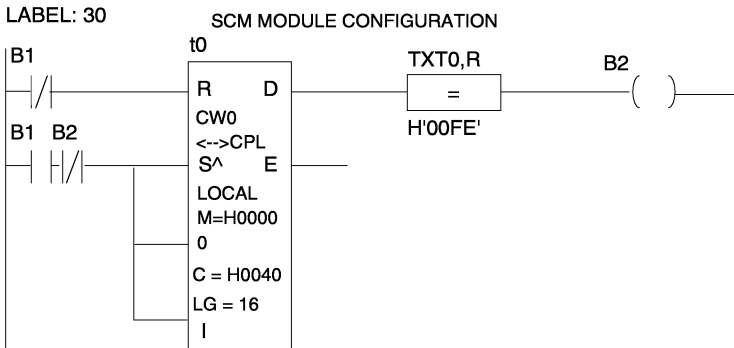
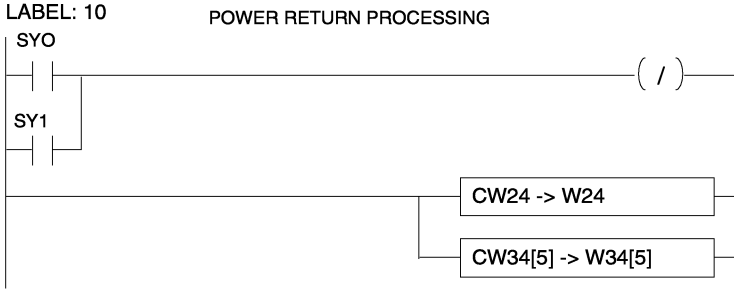
t3



Send two messages:
002 print, no display
003 store trend in RAM,
no display.

7 Application Examples

Using the XBT Terminal in ASCII Mode



7 Application Examples

Using the XBT Terminal in ASCII Mode

XBT- B8141 and XBT- C8241

Examples: Documents printed. Log printout selected

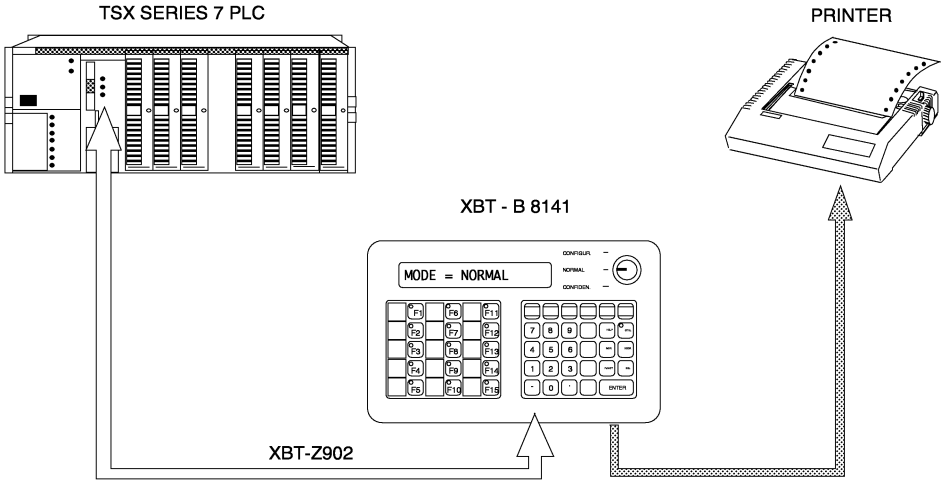
02-55-16	PERSONNEL ENTERS	System
----------	------------------	--------

Printout and store automatic log in memory:

02-57-16	MODE = CONFIDEN	
02-57-22		
02-57-22	MODE = NORMAL	System
02-57-26	TEMP = +2_ S_	
02-57-33	TEMP = +8_ S_	System

7.2 Using the XBT Terminal in Adjust Mode

• Hardware configurations



The XBT is connected to the programming port of the PLC via an XBT-Z902 cable (refer to sub-section 8.5)

- A printer can be connected to the printer port on an XBT-B8141 or XBT-C8251 using a cable (refer to sub-section 8.10).

• Print function:

The printer line can be configured for "automatic printing" (continuous log) where all messages displayed by the XBT terminal are printed, or configured for "triggered printing" where only messages sent to the XBT terminal by the automated system are printed. Storage in RAM of the log can also be set to automatic or triggered mode.

Using the XBT Terminal in Adjust Mode

- Principle of operation

OPERATOR ACTION	DISPLAY	EXCHANGES XBT ↔ TSX 7 PLC	DESCRIPTION
Press F12	TIME = ---S Field blinks		Request access to the preset of timer T0 assigned to function key F12
2 + 5 + ENTER	TIME = 25 S	VALUE 25 --> T0,P	Update preset word T0,P of timer T0
Press F13	START CYCLE	Set Bit B1 to 1	Assigned bit B1 is set to 1 and starts timer T0
Press F10	TEMP = 21 S	Transfer content of T0,V	Request display of the countdown of timer T0 (content of T0,V)

ALL EXCHANGES ARE USER TRANSPARENT

Using the XBT Terminal in Adjust Mode

• XBT Message memory

PRINT MESSAGES							
Nbr	X	Y	Message text	T	K	Coef	Var.
010	00	2	TEMP=_ _ _ S	V	1	1	T0,V
011	00	1	END OF CYCLE	D	1	1	#
012	00	1	TIME =_ _ _ S	N	1	1	T0,P
013	00	2	START CYCLE	F	1	1	B1
014	00	1		V	1	1	#

• PLC memory

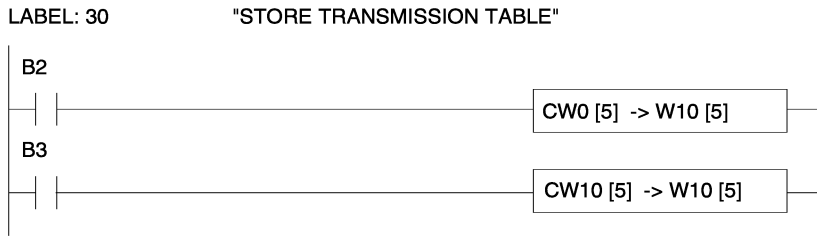
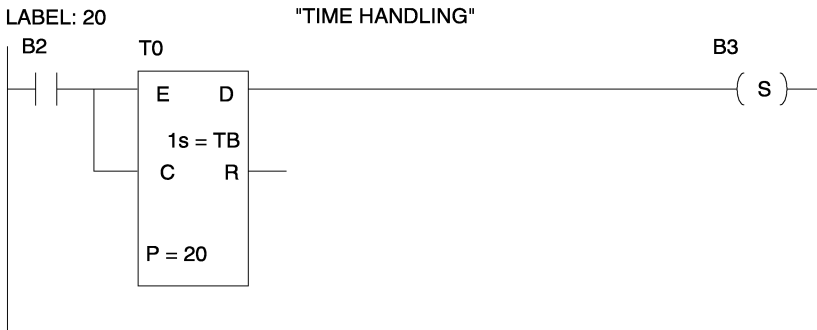
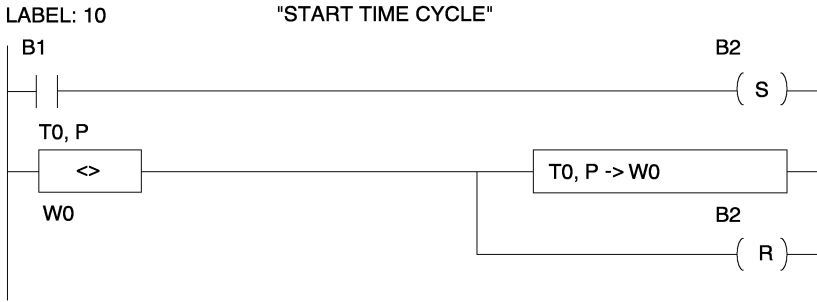
CW0	V	ESC
CW1	1	0
CW2	@	0
CW3	CR	G

CW10	V	ESC
CW11	1	0
CW12	@	1
CW13	CR	G

Command @ G and ESC V... display the message, print it and store it in the log RAM if the printer configuration is "triggerred printing" and "triggerred log".

Using the XBT Terminal in Adjust Mode

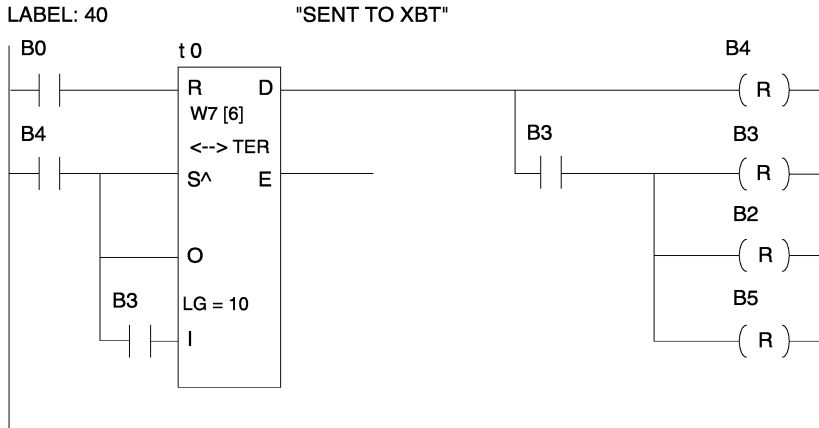
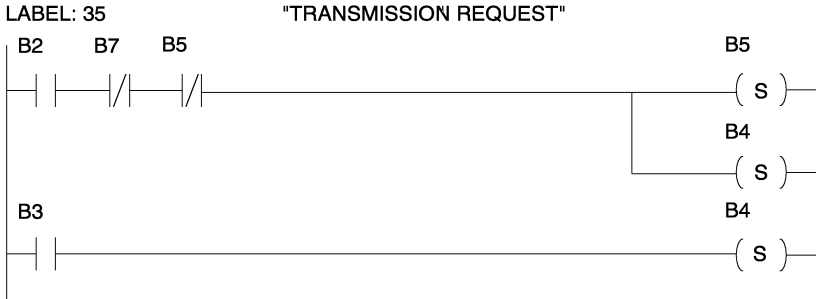
• TSX 7 PLC Application Program



7 Application Examples

Using the XBT Terminal in Adjust Mode

Application Program (contd)



7 Application Examples

Using the XBT Terminal in Adjust Mode

XBT-B8141 / C8251 output obtained:

- **Printer line configured for "Triggered Print" and "Triggered Log"**

02-16-52	TIME = 24 S	System
02-17-02	TIME = 14 S	System
02-17-13	TIME = 4 S	System
02-17-16	END OF CYCLE	System

ONLY MESSAGES DISPLAYED AT THE REQUEST OF THE SYSTEM ARE PRINTED

PRINT LOG		
02-16-52	TIME = 24 S	System
02-17-02	TIME = 14 S	System
02-17-13	TIME = 4 S	System
02-17-16	END OF CYCLE	System

Using the XBT Terminal in Adjust Mode

● Printer configured for "Automatic Print"
and "Automatic Log"

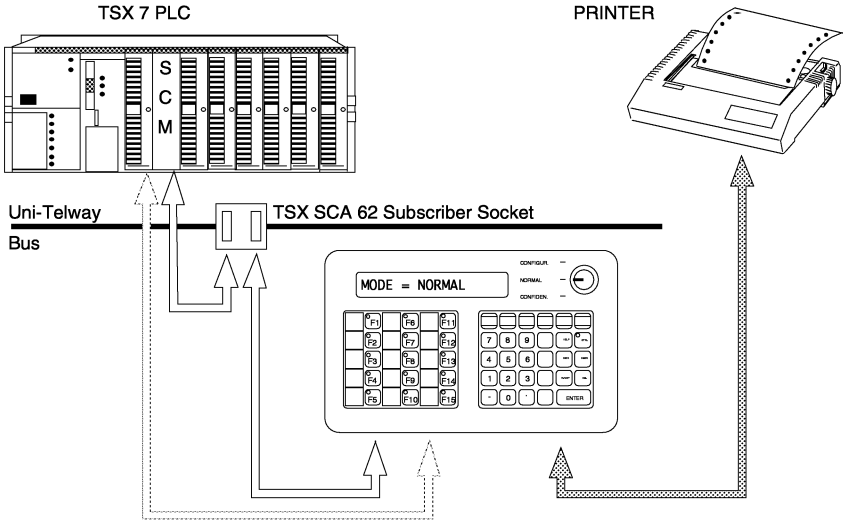
02-18-05		
02-18-05	MODE = NORMAL	
02-18-10	DURATION = 25 S	
02-18-11	DURATION = 25 S	
02-18-13	START CYCLE	
02-18-13		
02-18-13	MODE = NORMAL	
02-18-14	TIME = 25 S	System
02-18-21	TIME = 17 S	System
02-18-32	TIME = 7 S	System
02-18-38	END OF CYCLE	System
02-18-41	END OF CYCLE	
02-18-47		

ALL OF THE MESSAGES DISPLAYED BY THE TERMINAL
ARE PRINTED

PRINT LOG		
02-18-05		
02-18-05	MODE = NORMAL	
02-18-10	DURATION = 25 S	
02-18-11	DURATION = 25 S	
02-18-13	START CYCLE	
02-18-13		
02-18-13	MODE = NORMAL	
02-18-14	TIME = 25 S	System
02-18-21	TIME = 17 S	System
02-18-32	TIME = 7 S	System
02-18-38	END OF CYCLE	System
02-18-41	END OF CYCLE	
02-18-47		
02-18-47	MODE = CONFIDEN.	

7.3 Using the XBT Terminal with Uni-TE Protocol

• Hardware Configuration:



- The XBT-.8... terminal is connected to a Uni-Telway bus through the TSX SCA 62 subscriber socket and an XBT-Z908 cable or directly by an XBT-Z918 cable.
- The Master PLC is equipped with a TSX SCM 21.6 module.
If an XBT-B8141 or -C8251 terminal is used, a printer can be connected.
- (refer to sub-section 8.10).

• PLC and TSX SCM 21.6 module configuration:

The text block is configured for exchanges between TSX SCM and XBT terminal:

- Text block type:
 - CPL type to dialog with the TSX SCM 21.6 module
- Communication medium:
 - LOCAL when the TSX SCM 21.6 module is located in the same rack as the user program.
 - NET to dialog with a TSX SCM 21.6 module in the same PLC as the user program or in another PLC with communication via a Telway 7 network.
- Direct and indirect addressing modes are used for the transmission and reception tables,
- Transmission and reception buffers.

Note: See TSX Series 7 PLC manuals for more information on text blocks.

7 Application Examples

Using the XBT Terminal with Uni-TE Protocol

- **Operating principle (exchanges between XBT and PLC)**
(An XBT-B8141 terminal is used)

OPERATOR ACTION	DISPLAY	EXCHANGES XBT ↔ System	DESCRIPTION
Power-up		← ESC F99 @@@ P @CR	Lock out the function keys except F8
	ENTER CODE--	← ESC R001 CR	System request to display message 001 stored in the XBT terminal.
Enter code 2 0 + ENTER	ENTER CODE=20	→ User transparent	The system checks code validity.
	PRESS F8	← ESC V003 [LF] CR	If valid code request message display " PRESS F8 "
Press F8		→ User transparent ESC C081 [LF] CR	Bit 125 set to 1 Key code sent.
	DOOR OPEN	← ESC V004 [LF] CR	Command to display the message previously stored in the XBT terminal.
	ENTRY REFUSED blinking	← ESC V002 @G CR	If invalid code, request display of message 002 stored in the XBT terminal (type D message).
Validate ENTER	ENTRY REFUSED fixed	→ ESC F002 LF CR	Acknowledge message.

Using the XBT Terminal with Uni-TE Protocol

• Messages stored by the XBT terminal

Uni-Telway address
corresponding to the system gate
of the local PLC

Nbr.	TEXT	Type	X	Y	K	C	V	R	S	G	U	W
001	ENTER CODE= ---	N	1	1			W40	0	254	0	254	0
002	ENTRY REFUSED	D	1	1				0	254	0	254	0
003	PRESS F8	V	1	1				0	254	0	254	0
004	DOOR OPEN	V	1	1				0	254	0	254	0
008	DOOR CLOSED	F	1	1			B125	0	254	0	254	0

• Using PLC objects:

Constant words		ASCII CODE		HEX.		
CW	75	V	ESC	56	1B	Call MESSAGE 3
CW	76	0	0	30	30	
CW	77	CR	3	0D	33	
CW	80	V	ESC	56	1B	Call MESSAGE 2
	81	0	0	30	30	
	82	CR	2	0D	32	
CW	85	V	ESC	56	1B	Call MESSAGE 4
	86	0	0	30	30	
	87	CR	4	0D	34	

Using the XBT Terminal with Uni-TE Protocol

• Using PLC objects:

Constant words		ASCII CODE		HEX.	
CW	95	F	ESC	46	1B
	96	9	9	39	39
	97	@	@	40	40
	98	@	P	40	50
	99	CR	@	0D	40
CW	103	R	ESC	52	1B
	104	0	0	30	30
	105	@	1	40	31
	106	CR	G	0D	47

Lock-out all function keys except **F8**

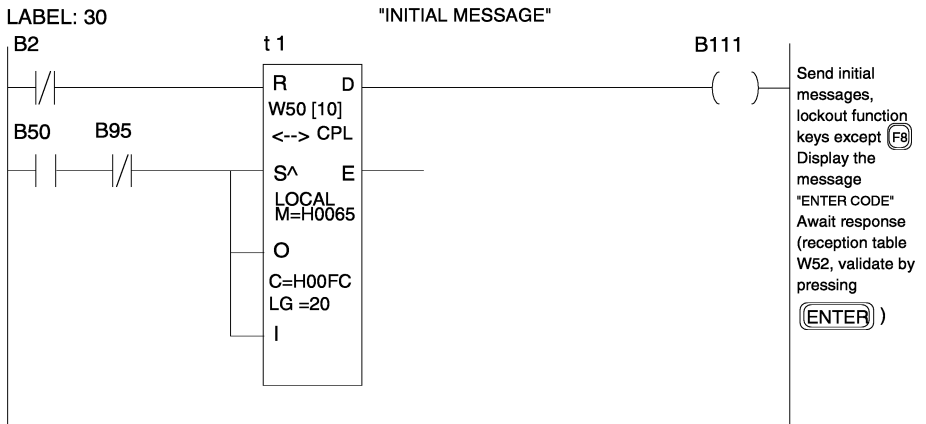
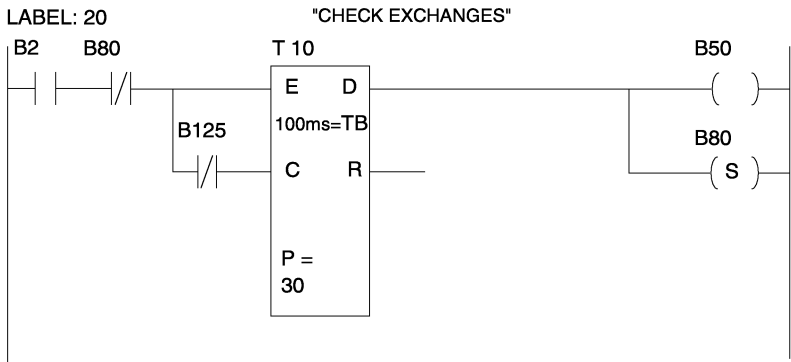
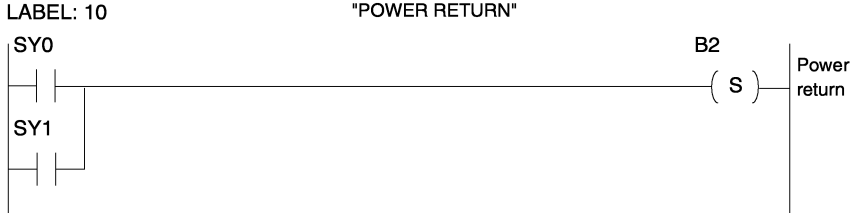
Call MESSAGE 1

• Using PLC bits:

B60	Check code: "ENTRY ACCEPTED"
B61	Check code: "ENTRY REFUSED"
B62	DOOR OPEN
B66	Reinitialization after "ENTRY REFUSED"
B68	Operator response after pressing F8
B80	"RESET" = Start timer
B95	On validation set entry code to 1

Using the XBT Terminal with Uni-TE Protocol

• TSX 7 Application program

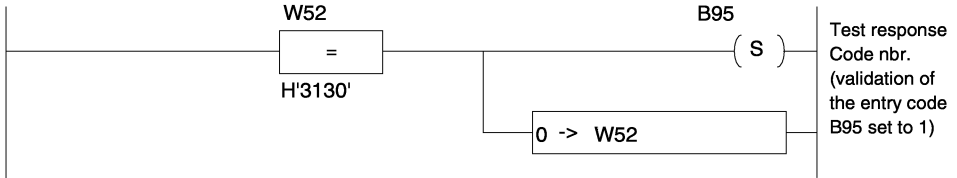


7 Application Examples

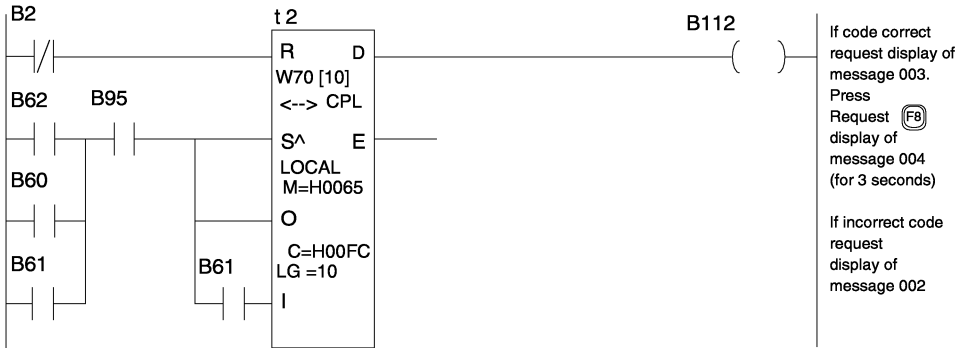
Using the XBT Terminal with Uni-TE Protocol

Application program (contd)

LABEL: 40



LABEL: 50



LABEL: 60



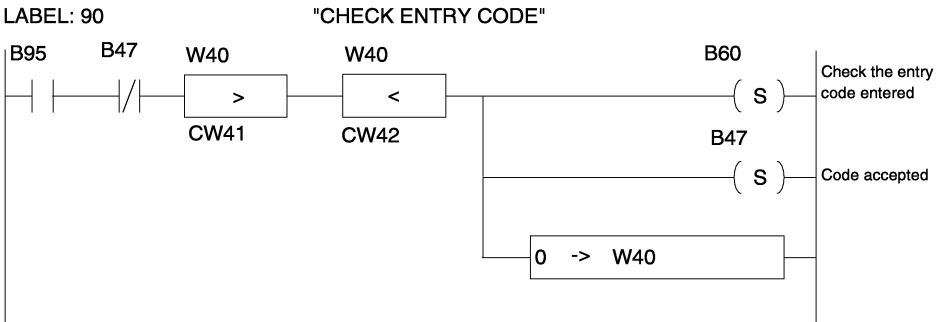
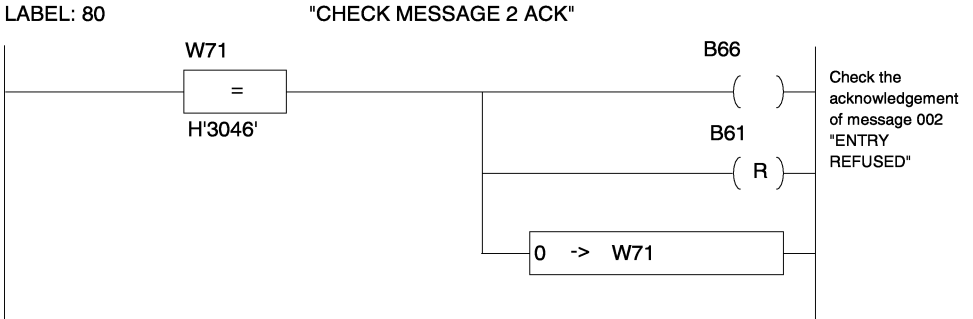
LABEL: 70



7 Application Examples

Using the XBT Terminal with Uni-TE Protocol

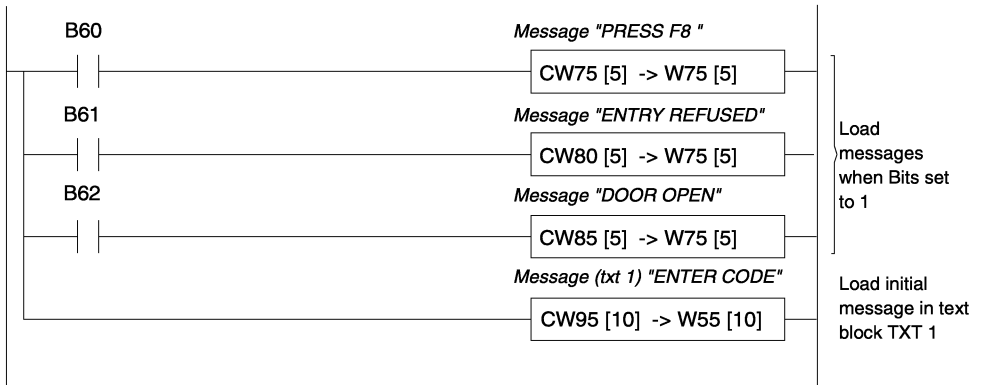
Application program (contd)



Using the XBT Terminal with Uni-TE Protocol

Application program (contd)

LABEL:110 "LOAD MESSAGES"



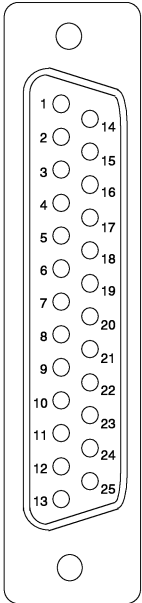
LABEL:120 "REINITIALIZATION"



8.1 Connector Pin Arrangement

8.1.1 Serial Connector Pin Arrangement

Type of connector: 25-pin female Sub-D connector,
type HE50 NF-C 93425.



Pin Number	Name	Function	
1	PG	Chassis ground \perp	
2	TXD	RS-232C transmission	
3	RXD	RS-232C reception	
4	A	RS-422/485 transmission (TXD +)	
5	B	RS-422/485 transmission (TXD -)	
6	A'	RS-422/485 reception (RXD +)	
7	SG (0V)	RS-232C common	
8	COM	Multipoint address common (pins 14 to 17 and 19)	
9	RXD+	Current loop reception, isolated	
10	RXD-	Current loop reception, isolated	
11		Reserved	
12		Reserved	
13	C	Relay common (XBT-C...)	
14	B0	Terminal addr. in multipoint ASCII & Uni-Telway operation (binary 1)	
15	B1	Terminal addr. in multipoint ASCII & Uni-Telway operation (binary 2)	
16	B2	Terminal addr. in multipoint ASCII & Uni-Telway operation (binary 4)	
17	B3	Terminal addr. in multipoint ASCII & Uni-Telway operation (binary 8)	
18	B'	RS-422/485 reception (RXD -)	
19	B4	Terminal address in multipoint Uni-Telway operation (binary 16)	
20	TXD+	Current loop transmission, isolated	
21	TXD-	Current loop transmission, isolated	
22	0V ISO	RS-422/485 common	24VDC isolated, unregulated supply, 100 mA max.
23	24V ISO	24VDC isolated	
24		Reserved	
25	T	Relay operating contact (XBT-C...)	

TO ENSURE CORRECT ELECTRICAL CONNECTION, ALWAYS TIGHTEN THE TWO RETAINING SCREWS ON THE CONNECTOR.

CAUTION: BEFORE MAKING ANY CONNECTIONS, ENSURE THAT THE PINS ON THE TERMINAL CORRESPOND TO THE REQUIRED AUTOMATION SYSTEM CONNECTIONS OR SERIOUS DAMAGE MAY RESULT TO THE TERMINAL ON POWER-UP. INCORRECT CONNECTION VOIDS THE WARRANTY.

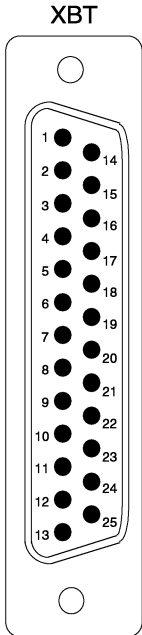
Connector Pin Arrangement

8.1.2 Printer Connector Pin Arrangement

ONLY APPLIES TO XBT-B8141 AND XBT-C8251 TERMINALS

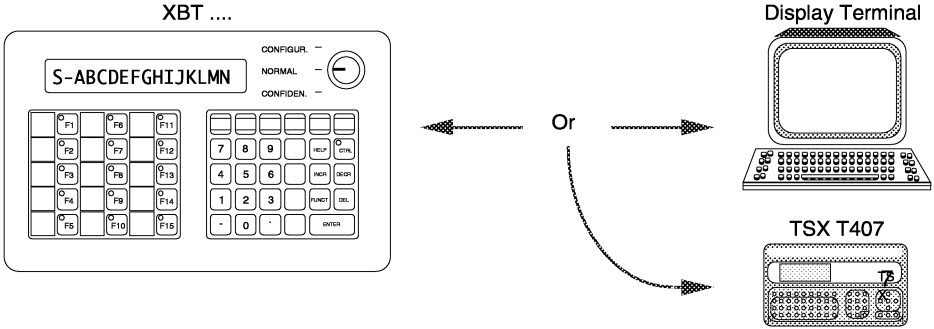
Type of connector: 25-pin female Sub-D connector, type HE50 NF-C 93425.

Pin Number	Name	Function
1	PG	Signal ground \perp
2	TXD	RS-232C transmission
3	RXD	RS-232C reception
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	SG	0 Volt RS-232C common
8		Reserved
9	INITIAL /	General printer initialization
10	STROBE /	Data read authorization signal
11	+5V	RS-232C / CL converter supply
12	DATA 1	} 8 data bits (parallel transmission)
13	DATA 2	
14	DATA 3	
15	DATA 4	
16	DATA 5	
17	DATA 6	
18	DATA 7	
19	DATA 8	
20	DTR	Printer ready
21	BUSY	Printer busy
22	PAPEREMPTY	Paper empty
23	ERROR /	Printer error
24	SELECT	Printer "ON-LINE"
25	ACK /	Acknowledge data reception



TO ENSURE CORRECT ELECTRICAL CONNECTION, ALWAYS TIGHTEN THE TWO RETAINING SCREWS ON THE CONNECTOR.

8.2 Connecting a Display or TSX T407 Terminal



Connection between an XBT terminal and a Display terminal or a TSX T407 terminal requires the use of an XBT-Z905 (RS-232C) cable: XBT-Z905 Ref. Nbr at the XBT terminal end.

The transmission parameters must be set before the exchange can start (refer to sub-section 4.5, Configuration).

For the pin arrangement of the XBT-Z905 cable, refer to sub-section 8.

8.3 Connecting a PC-PS/2 Microcomputer

The XBT terminals can be connected to a PC-PS/2 to perform operations on the application (creation, storage, modification or transfer) using XBT-L100 programm.

ONLY RS-232C TRANSMISSIONS CAN BE USED. USE OF ANY OTHER TYPE OF TRANSMISSION MAY RESULT IN SERIOUS DAMAGE TO THE TERMINAL AND VOID THE WARRANTY.

The electrical characteristics are set and cannot be modified (RS-232C). Connection is made to serial port COM1 on the PC-PS/2.

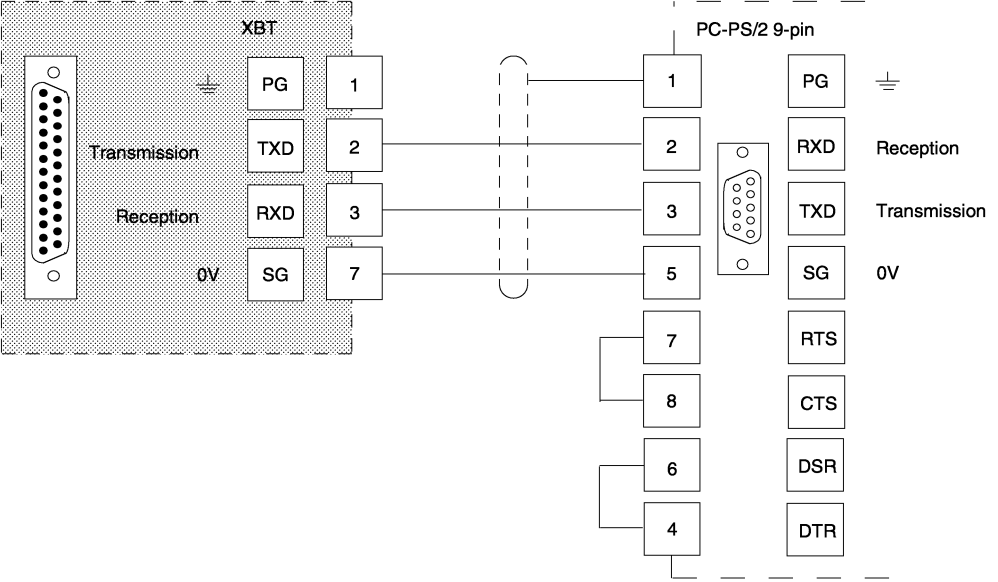
8.3.1 Local Mode Connection

Depending on the type of PC-PS/2 used, select one of the cables below:

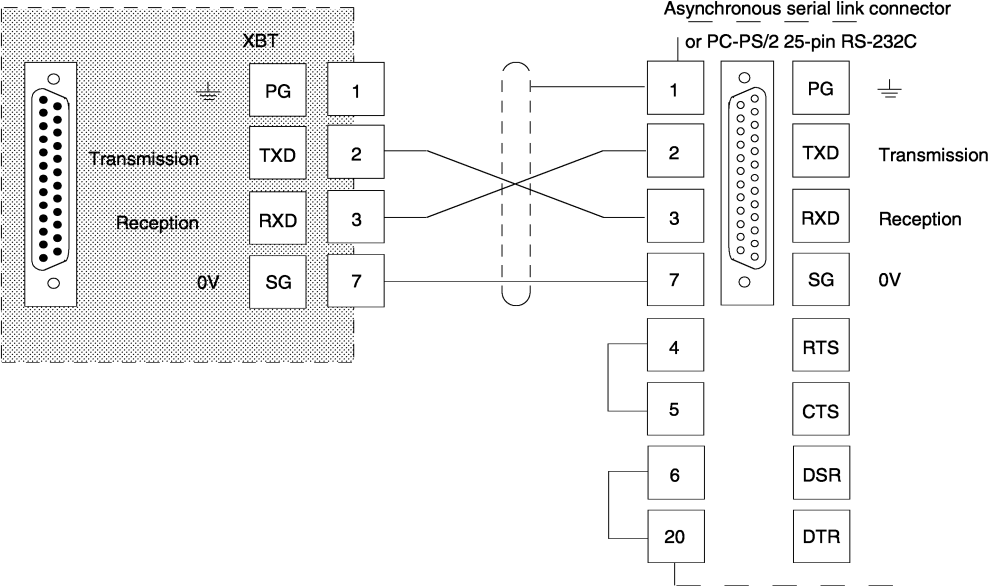
PC-PS/2 Serial Port Connector	Cable		Length
	Ref. Nbr.	Index	
9-pin male	XBT-Z915	21	2.50 m
25-pin female	XBT-Z905	21	2.50 m
25-pin male	XBT-Z9052	11	2.50 m

Connecting a PC-PS/2 Microcomputer Local Mode Connection

XBT Z915 connection cable pin arrangement:



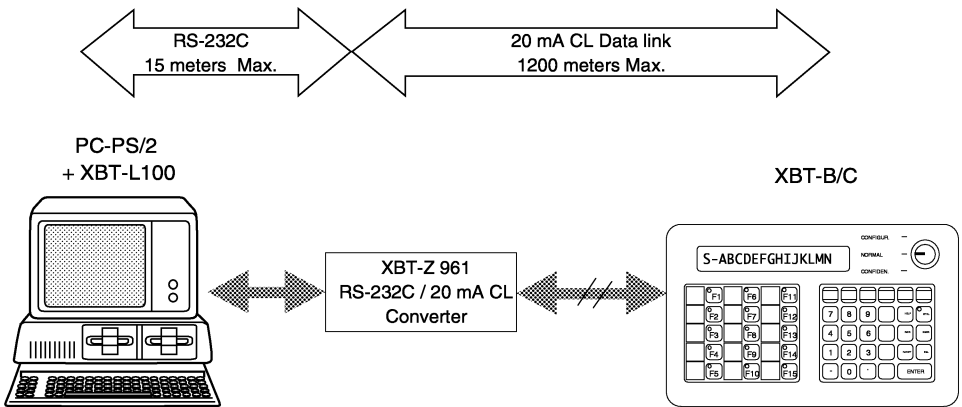
XBT-Z905 (level 21) and XBT-Z9052 connection cable pin arrangement:



Connecting a PC-PS/2 Microcomputer

8.3.2 Remote Connection

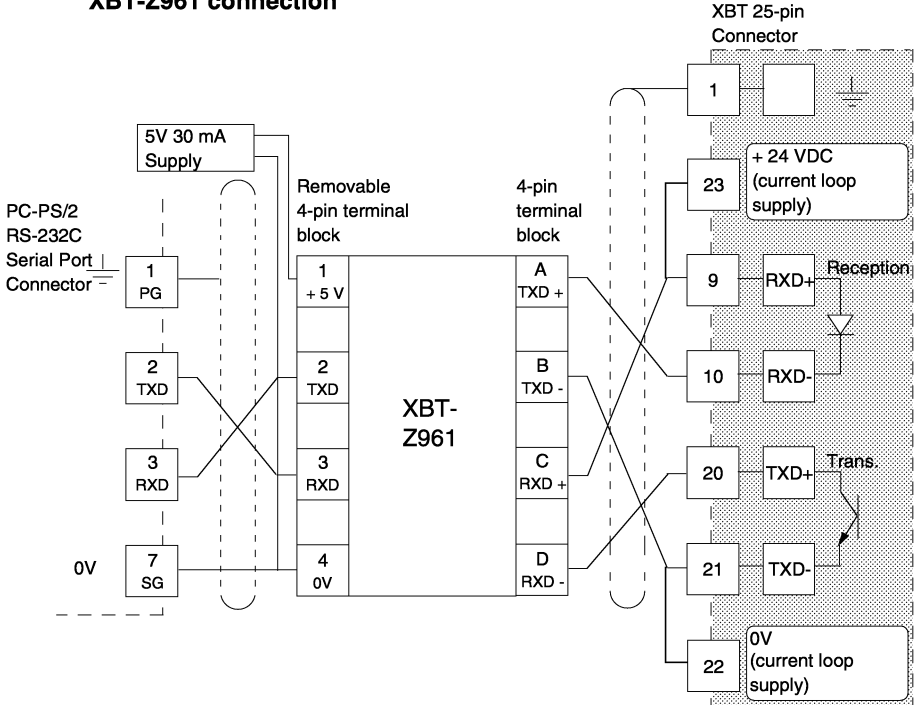
The RS-232C standard restricts the distance between the PC-PS/2 microcomputer and the XBT terminal to 15 meters. In some applications, it can be useful to be able to load, transfer or modify messages stored in the XBT terminal using XBT-L100 programm at greater distances. In this case, an RS-232C / 20 mA Current Loop XBT-Z961 converter can be used. Transmission uses the 20 mA current loop and the distance can reach a maximum of 1200 meters. Transmission speed is adapted to match the length of the data link.



THE MAXIMUM TRANSMISSION SPEED IS 9600 BAUD

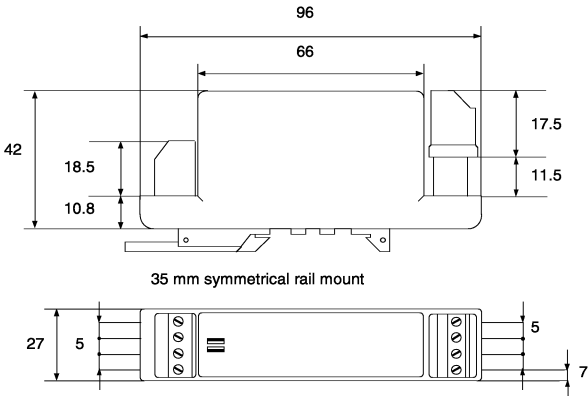
**Connecting a PC-PS/2 Microcomputer
Remote Connection**

XBT-Z961 connection



- At the RS-232C end, the 5V supply is external,
- At the 20mA current loop end, the XBT terminal provides the 24VDC supply required by the loop.

Dimensions:

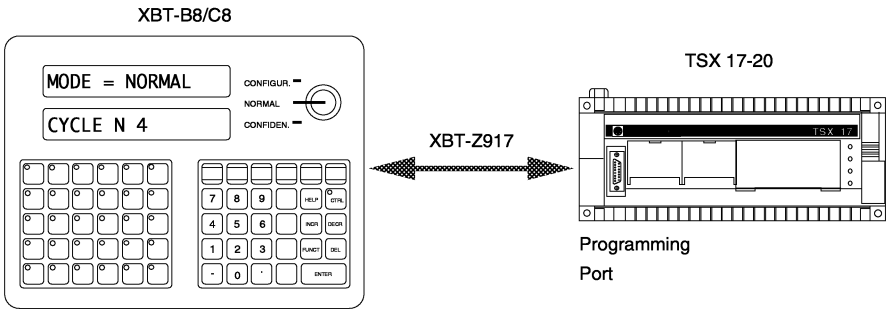


8.4 Connecting a TSX 17-20 Micro-PLC

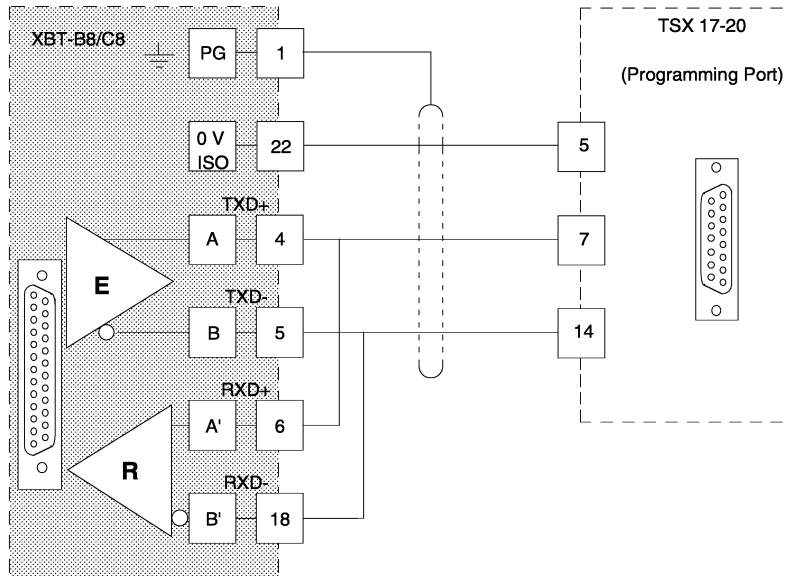
XBT-B8/C8 terminals connect to the programming port of the TSX 17-20 Micro-PLC via the same 5 meter length XBT-Z917 cable.

THE XBT TERMINAL OPERATES IN RS-485 ADJUST MODE (3-WIRE DATA LINK) WITH HALF-DUPLEX EXCHANGES.

Note: The RS-485 standard is an extension of the RS-422 standard ("4-wire" differential transmission). It requires looping-back the transmitter to the receiver of the XBT terminal and half-duplex operation.



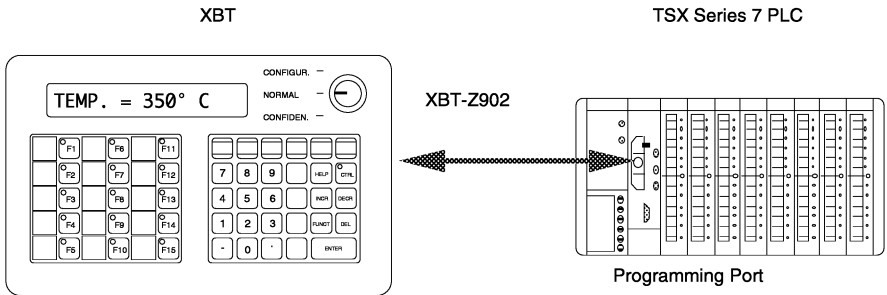
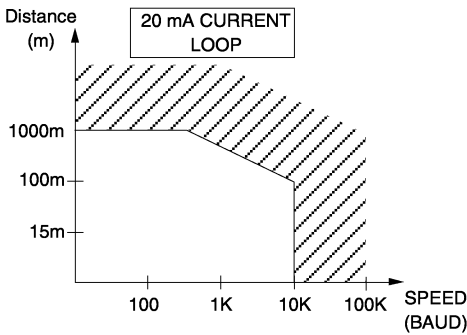
XBT-Z917 cable pin arrangement.



8.5 Connecting a TSX 27/47 PLC

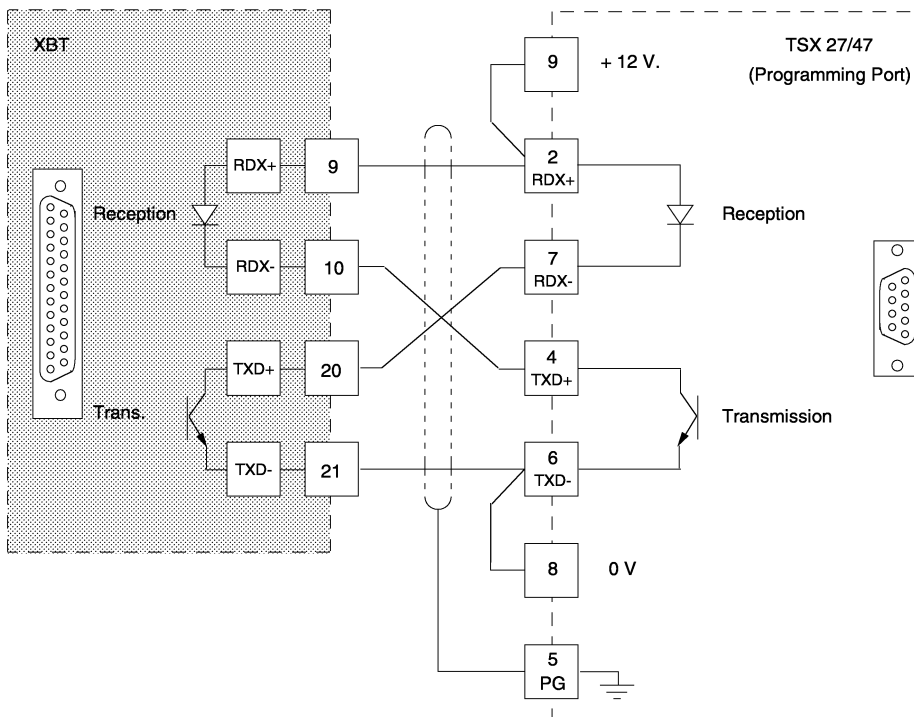
The XBT terminal connects to the programming port of a TSX 27/47 via a 2.5 meter length XBT-Z902 cable.

The supply to the current loop is provided by the TSX 27/47 PLC (Active). Current limiting is ensured by the XBT terminal (Passive Protected).



Connecting a TSX 27/47 PLC

• XBT-Z902 cable pin arrangement:



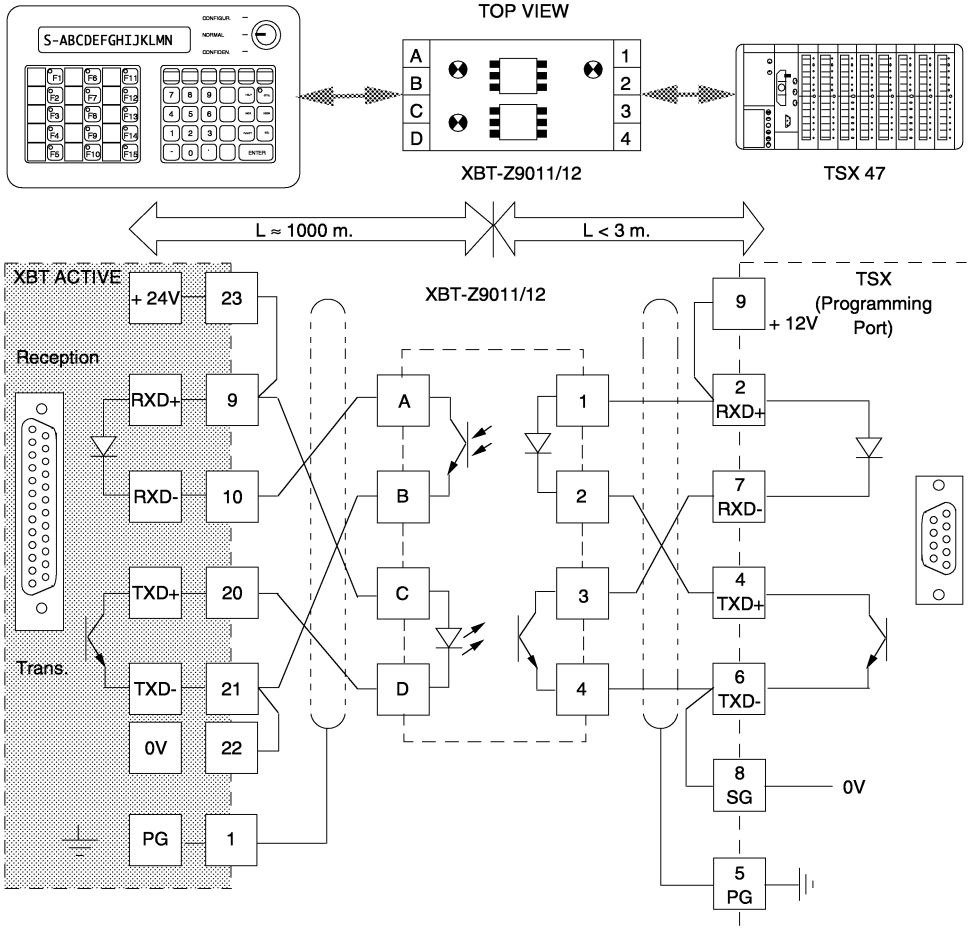
• Isolator for TSX 27 and TSX 47-100 PLCs

If the distance between the XBT terminal and the TSX Series 7 PLC exceeds 3 meters, the XBT-Z9011/12 isolator module should be used.

The total TSX7-XBT-Z90.. distance must not exceed 3 meters (using 2 shielded twisted pairs of at least 0.34 mm²AWG 22 gauge).

The total XBT-Z9011/12 - XBT distance can attain 1000 meters (using 2 shielded twisted pairs of at least 0.34 mm²AWG 22 gauge).

Connecting a TSX 27/47 PLC



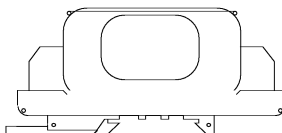
Physical characteristics:

- XBT-Z9011: symmetrical rail mount
- XBT-Z9012: asymmetrical rail mount



Dimensions:

- Length : 96 mm
- Width : 27 mm
- Depth : 42 mm



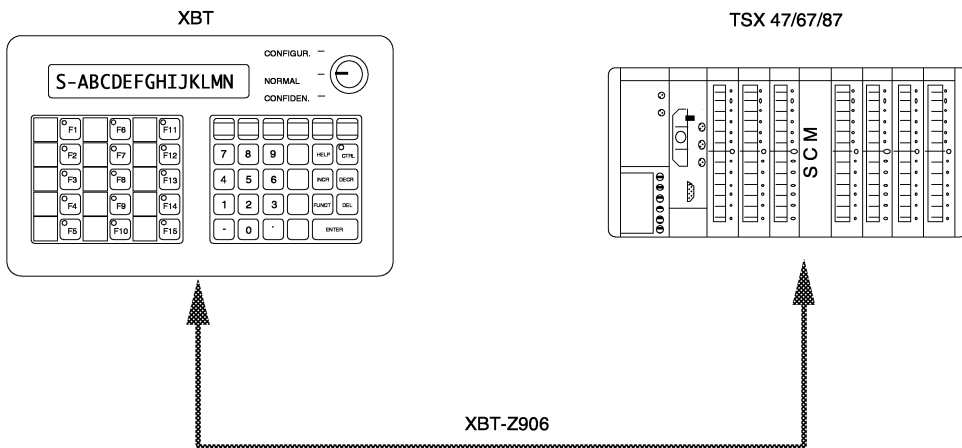
Transmission/Reception indication by LED indicators.

8.6 Connecting a Serial Communication Module

- **Current mode connection:**

THE XBT TERMINAL OPERATES IN ASCII, 20 mA CURRENT LOOP MODE

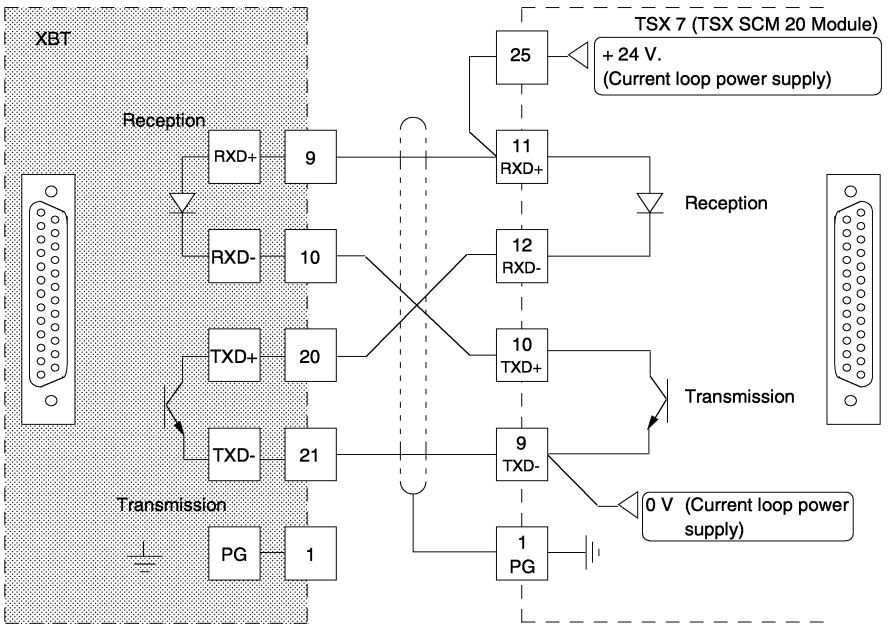
The supply to the current loop is provided by the Module (Active).
 Current limiting is ensured by the XBT terminal (Passive Protected).
 The maximum connection distance is 1000 meters (using two shielded twisted pairs of at least 0.34 mm² AWG 22 gauge).
 When a TSX Series 7 PLC is used, the XBT terminal is connected to the TSX SCM 20 module via a 2.5 meter length XBT-Z906 cable.



XBT-Z906 cable connection: XBT-Z906 reference number end towards the XBT terminal.

Connecting a Serial Communication Module

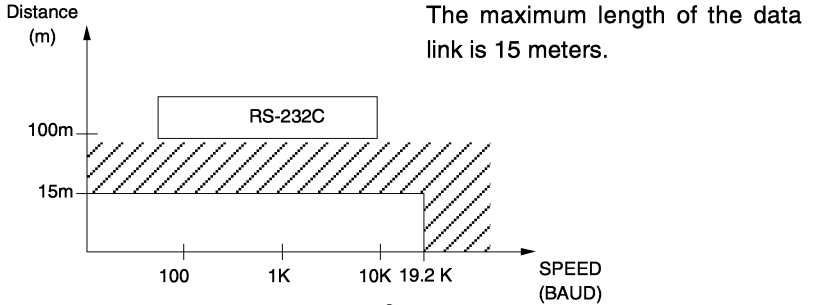
XBT-Z906 cable pin arrangement:



Connecting a Serial Communication Module

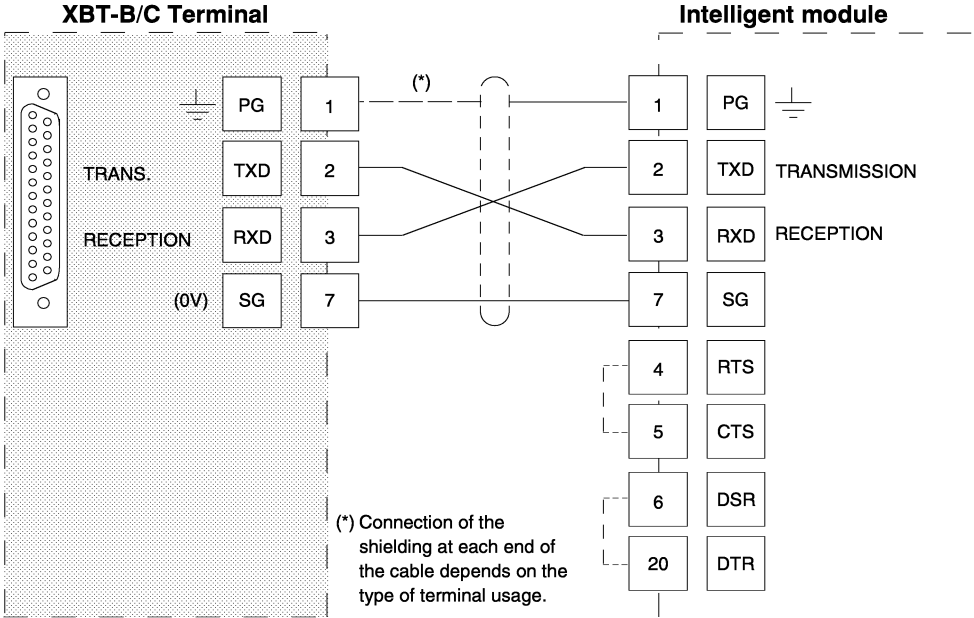
• RS-232C Connection

THE RS-232 C DATA LINK ONLY ALLOWS POINT-TO-POINT CONNECTION



Wiring = 3 shielded cables (0.34 mm² AWG22 gauge max.)

XBT-Z905 cable connection: XBT-Z905 ref. nbr. end to XBT terminal.



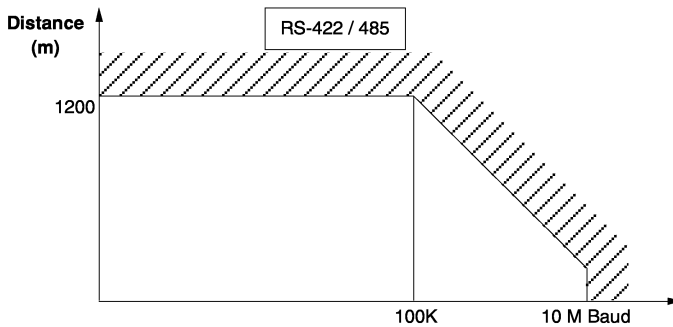
CONNECTIONS 4-5 AND 6-20 ARE OPTIONAL AND DEPEND ON THE DEVICE USED.

Connecting a Serial Communication Module

RS-422 mode connection:

THE XBT TERMINAL CAN OPERATE IN ASCII OR ADJUST MODES

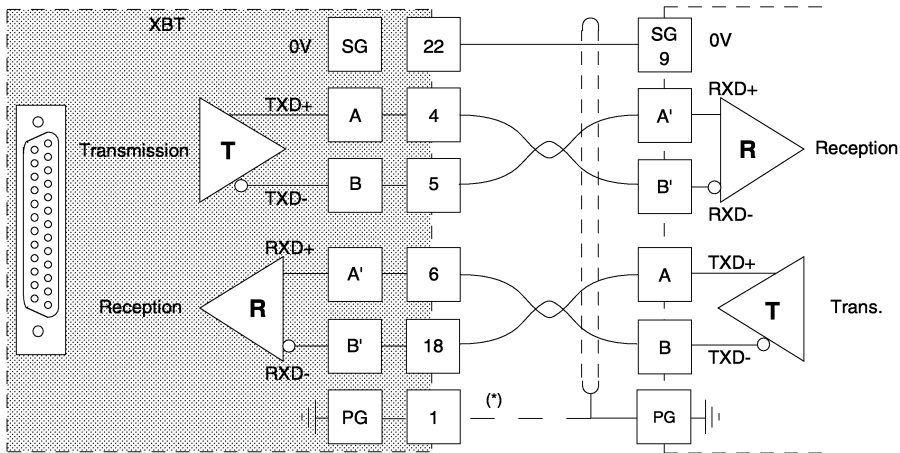
The transmission parameters must be set correctly.
To set the parameters, refer to the Configuration section.
The RS-422 standard defines a differential transmission mode.
This "4-wire" type of connection enables Full-Duplex operation.



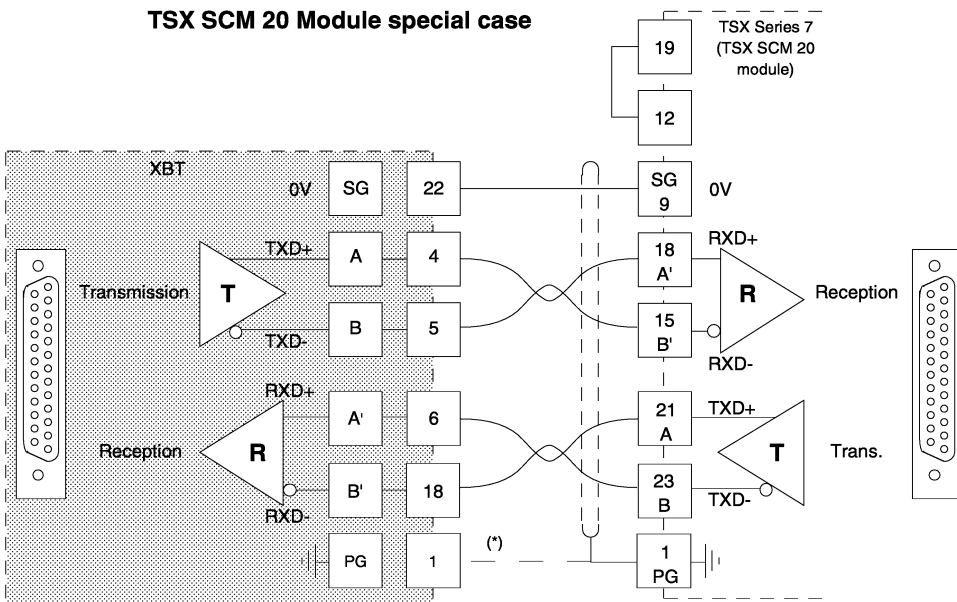
Connection: 2 shielded twisted pairs, 0.34 mm² (AWG 22) gauge minimum.

Connecting a Serial Communication Module

General case



TSX SCM 20 Module special case



* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

8.7 20 mA Current Loop Connection

THE 20 mA OPTICALLY ISOLATED CURRENT LOOP DATA LINK ENABLES POINT-TO-POINT OR MULTIPOINT CONNECTION

THE XBT TERMINAL CURRENT LOOP IS PROTECTED BY A 20 mA LIMIT.

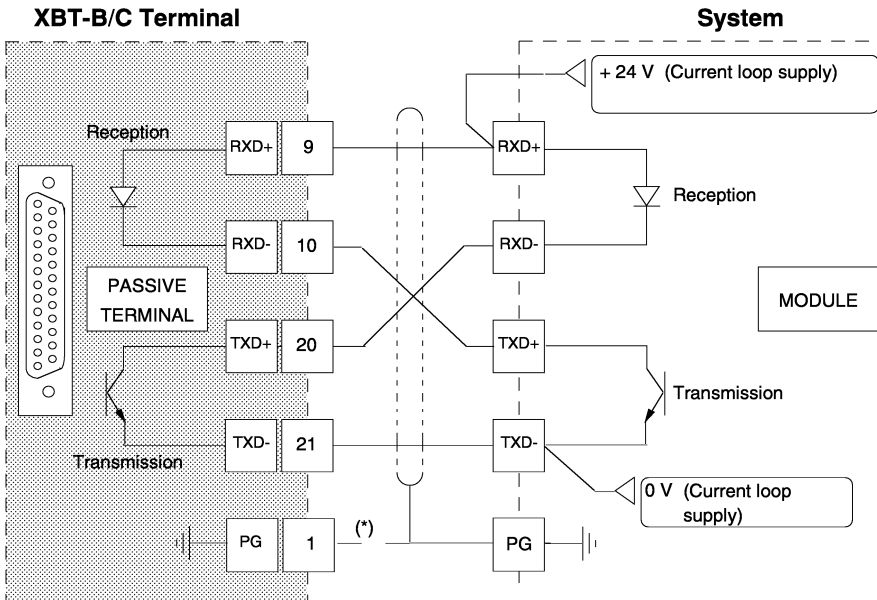
THE XBT TERMINAL CAN BE:

- PASSIVE = an external source supplies the current loop,
- ACTIVE = the XBT terminal supplies the current loop (U max. 24V, I max. 100 mA).

The maximum data link length is 1000 meters.

Wiring: 2 shielded twisted pairs of at least 0.34 mm² AWG 22 gauge.

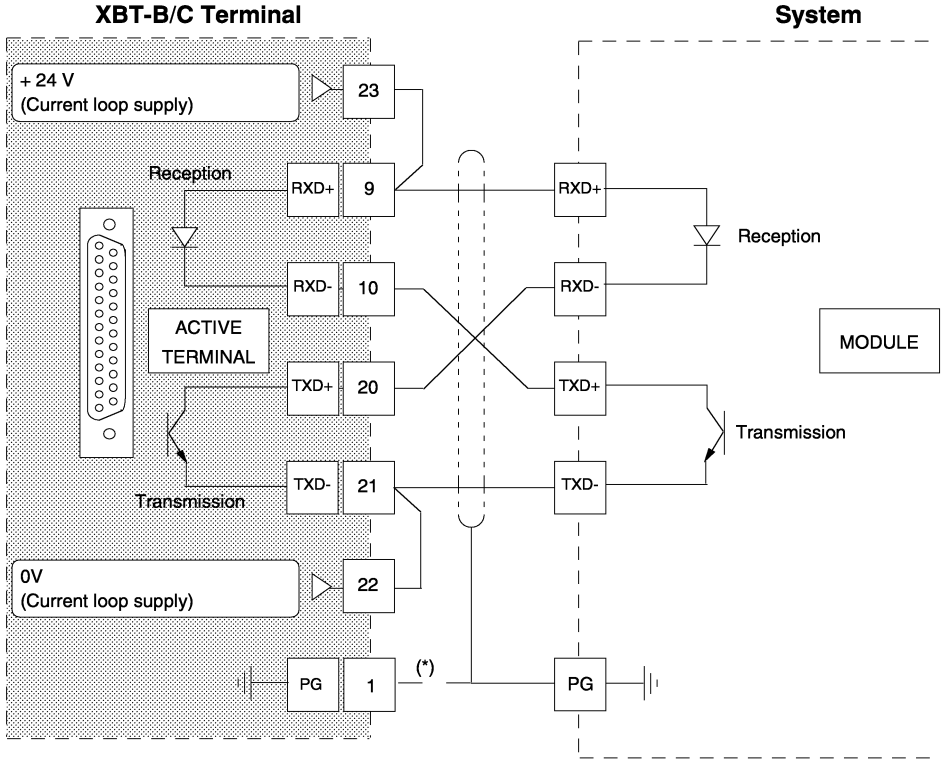
• Point-to-point connection



WHEN AN EXTERNAL SUPPLY IS USED (U MAX. 24V), THE RIPPLE ON THE EXTERNAL SUPPLY MUST NOT EXCEED < 5%.

*Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

20 mA Current Loop Connection (Point-to-Point)



THE CURRENT LOOP IS SUPPLIED BY THE XBT TERMINAL.

* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

20 mA Current Loop Connection

• Multipoint data link

In multipoint mode, the current loop data link enables Passing or Blocked current loop operation.

The maximum number of station that can be connected must comply with the requirements listed below:

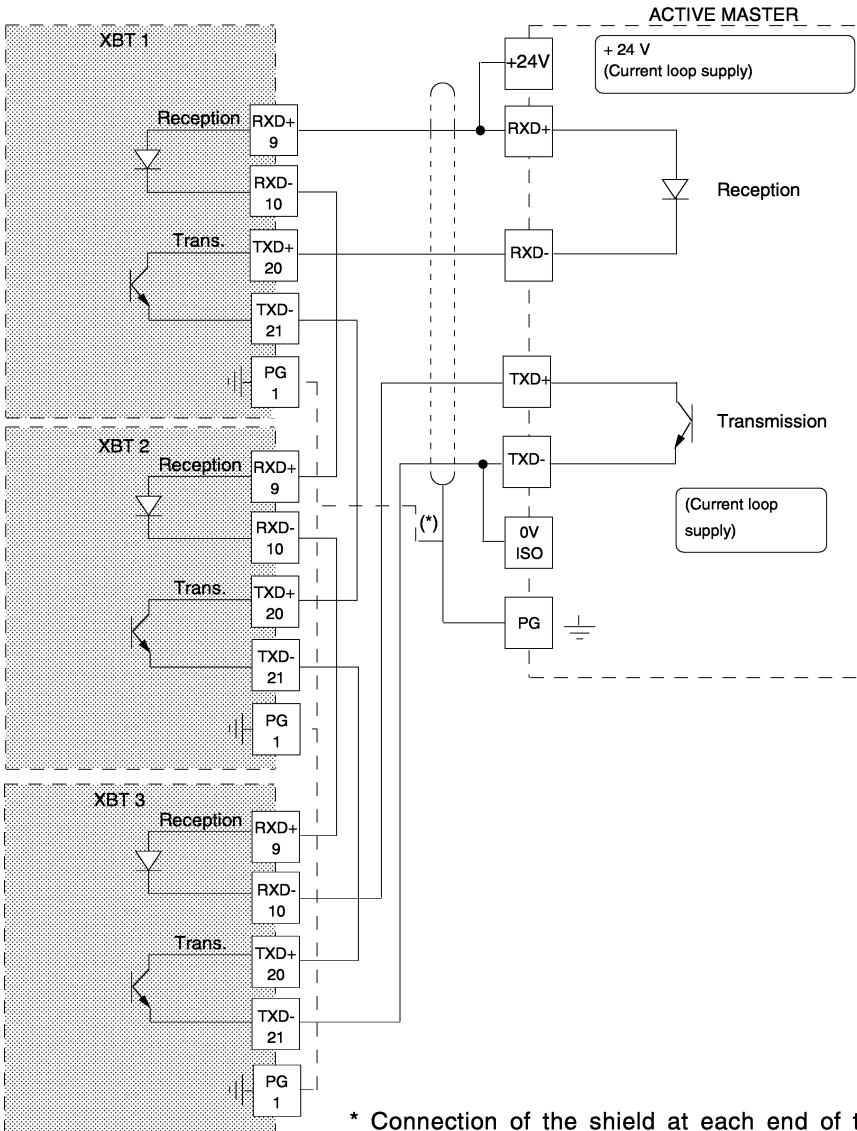
n = number of stations.

	PRINCIPLE	CONNECT.	EXTERNAL SUPPLY		XBT SUPPLY
			Max. voltage (U)	Current (MA)	$U = 24V$ MAX. = 100 MA
PASSING CURRENT LOOP	<p>A current from zone A circulates at rest in the loops:</p> <ul style="list-style-type: none"> • from Slave receivers to the Master sender, • from the Master receiver to Slave sender. 	SERIAL	$U > \sum \Delta U$ of connected stations ΔU XBT = 4V U MAX. ALLOWED PER XBT = 30V	$\geq 2 \times 20$ mA	$n < \frac{24}{\sum \Delta U}$ of connected stations $U \text{ MIN. } > 4V + \sum \Delta U$ of connected stations
BLOCKED CURRENT LOOP	<p>A current circulates alternately during transmission:</p> <ul style="list-style-type: none"> • The Master simultaneously sends to all Slaves. Its transmitter must support the sum of the currents of the Slave receivers: $n \times 20$ mA • The Master receives the transmission from a single Slave. Its receiver must absorb 20 mA. • Slave senders and receivers must each absorb 20 mA. 	PARALLEL	$U < U \text{ MAX.}$ SUPPORTED BY XBT (30V) $U \text{ MIN. } = 6V$	$n \times 20$ mA <div style="border: 1px solid black; padding: 2px; display: inline-block;">The Master sender must support $n \times 20$ mA.</div>	4 Slave stations + the Master

THE RIPPLE ON THE EXTERNAL SUPPLY MUST NOT EXCEED $< 5\%$.

20 mA Current Loop Connection (Multipoint)

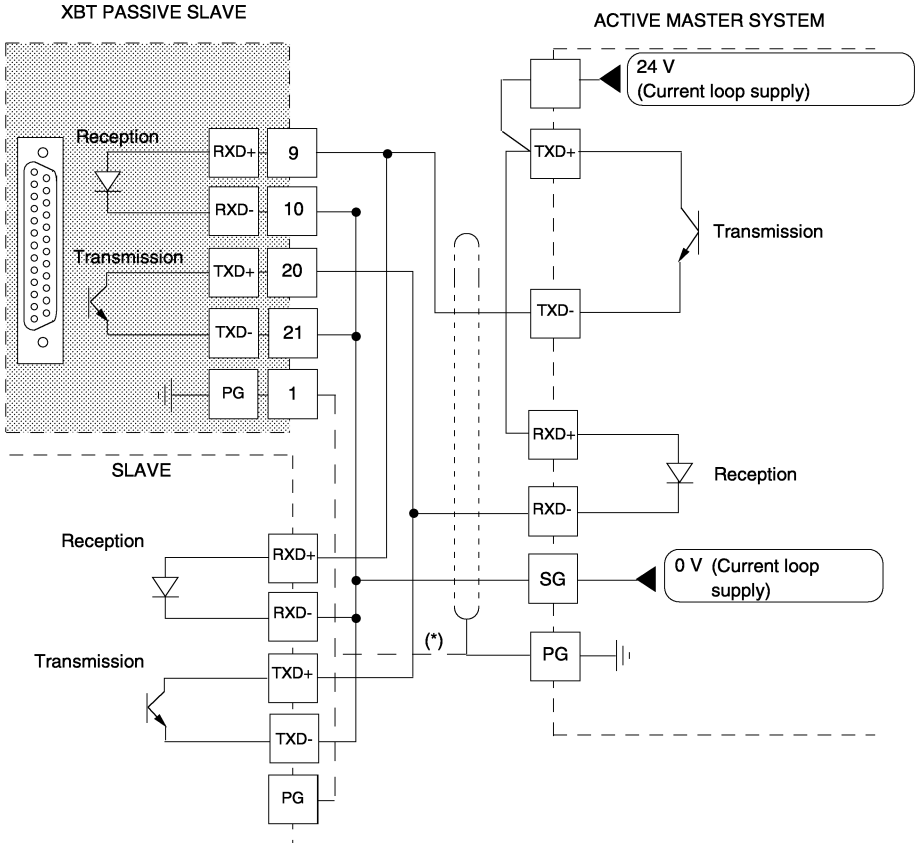
PASSING CURRENT LOOP:



* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

20 mA Current Loop Connection (Multipoint)

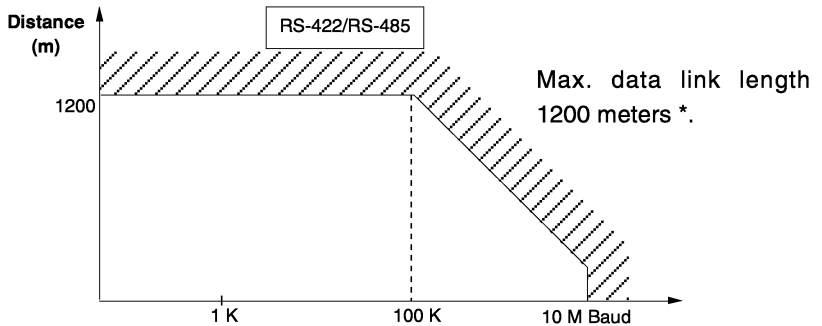
BLOCKED CURRENT LOOP:



* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

8.8 RS-422/485 Data Link

THE OPTICALLY ISOLATED RS-422/485 DATA LINK
ENABLES POINT-TO-POINT OR MULTIPOINT CONNECTION



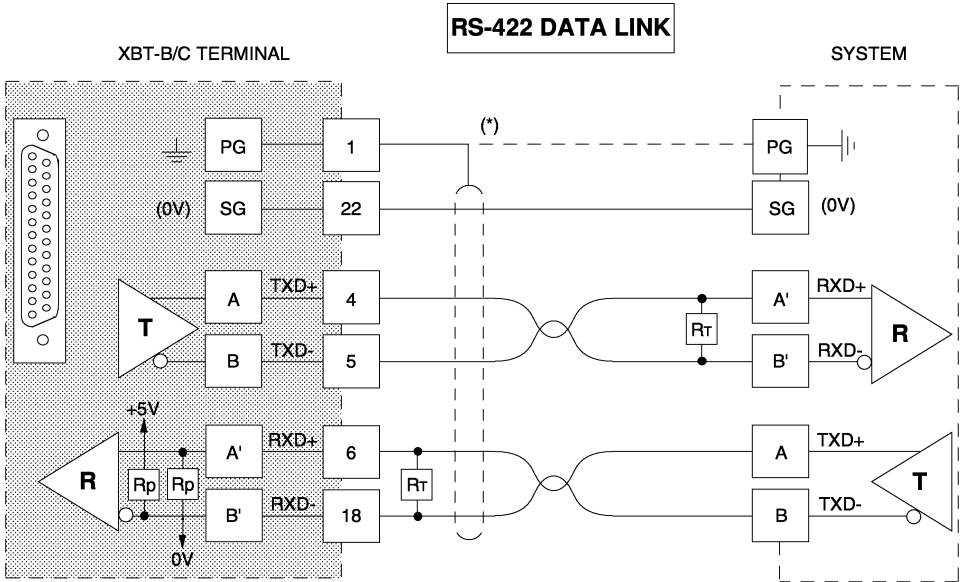
XBT terminals are fitted with pull-up resistors ($R_p = 4.7 \text{ K}\Omega$) on their receivers to ensure that the MARK level is maintained when the transmitter is idle or disconnected.

Wiring: 2 shielded twisted pairs of at least 0.34 mm^2 AWG22 gauge for transmission.

* THE MAXIMUM RS-422 DATA LINK LENGTH IS 1200 METERS IF
NO SPECIFIC RESTRICTIONS APPLICABLE TO DEVICES
CONNECTED TO THE XBT TERMINAL REDUCE IT.

RS-422/485 Data Link

• Point-to-point data link

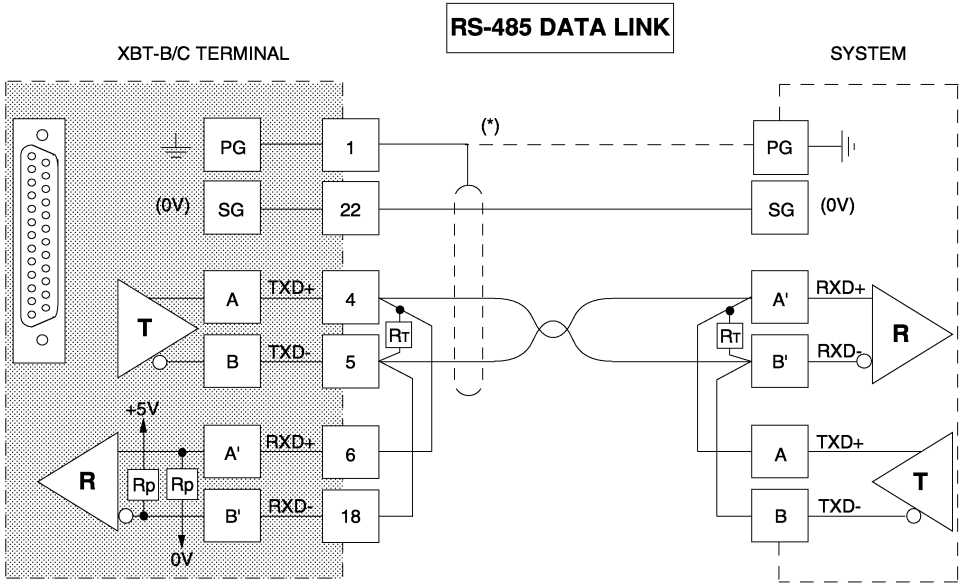


THE FITTING OF PULL-UP RESISTORS (R_p) ON THE AUTOMATED SYSTEM RECEIVER IS RECOMMENDED.

R_T : Line matching resistors (usually 110Ω).

* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

RS-422/485 Data Link



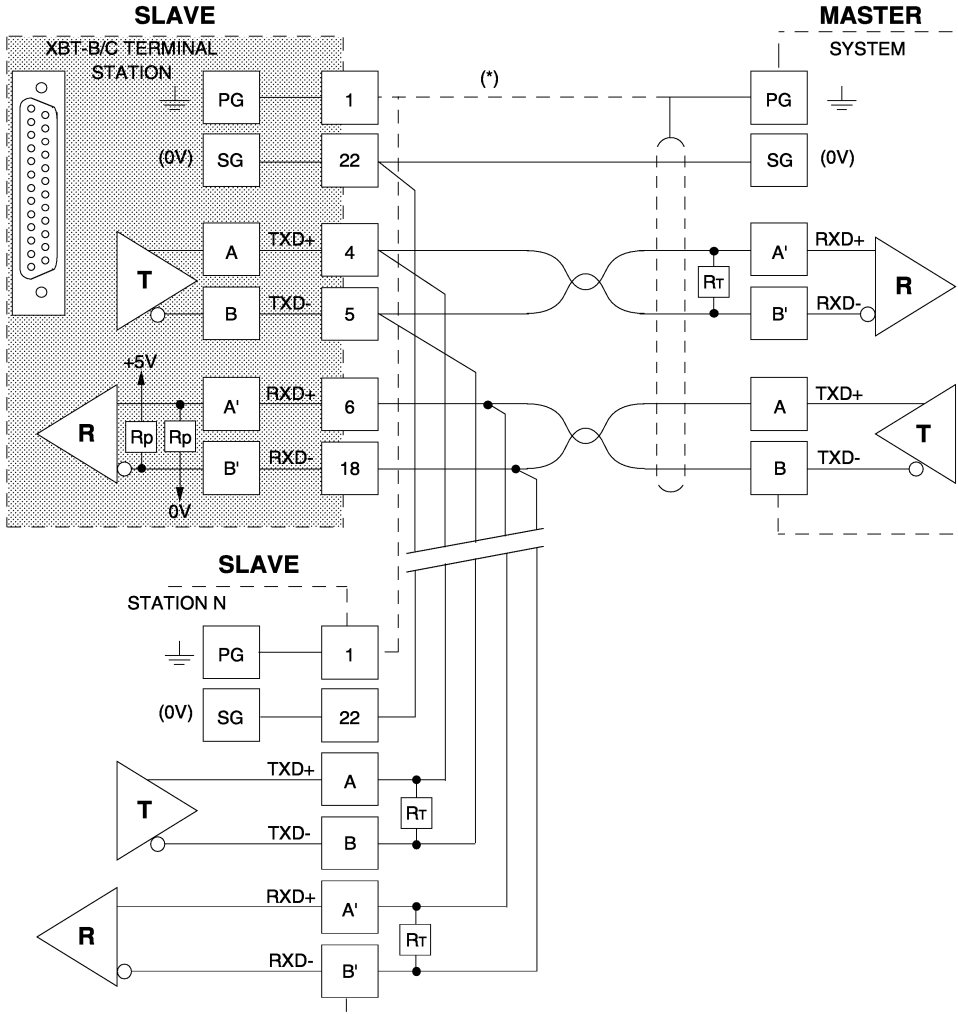
THE FITTING OF PULL-UP RESISTORS (R_p) ON THE AUTOMATED SYSTEM RECEIVER IS RECOMMENDED.

R_T : Line matching resistors (usually 110 Ω).

* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

RS-422/485 Data Link

• Multipoint RS-422 data link:



THE FITTING OF PULL-UP RESISTORS (R_p) ON THE RECEIVER AND TRANSMITTER OF END STATIONS IS RECOMMENDED.

Rt: Line matching resistors (usually 110 Ω).

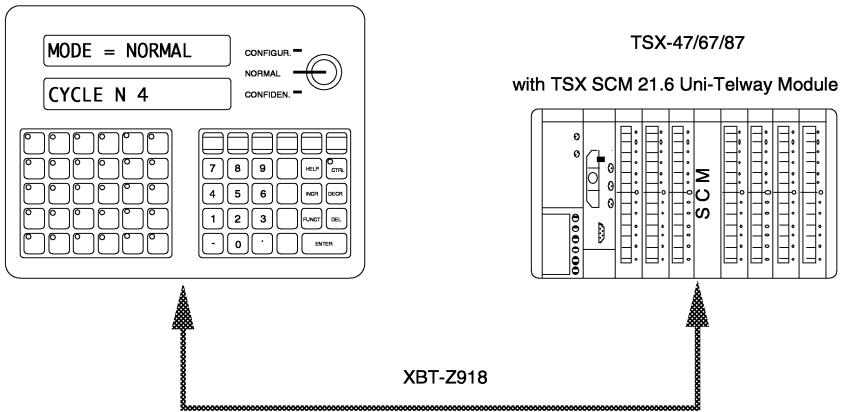
* Connection of the shield at each end of the cable depends on the installation's electrical characteristics.

8.9 Connecting to a Uni-Telway Bus

The XBT-B8... and XBT-C8... terminals have an RS-485 interface that meets the requirements for the Uni-Telway physical layer.

8.9.1 XBT-B8/C8 to TSX SCM 21.6 Connection

When a point-to-point Uni-Telway connection is used between a TSX SCM 21.6 Master and an XBT Slave, use a 5 meter length XBT-Z918 cable.

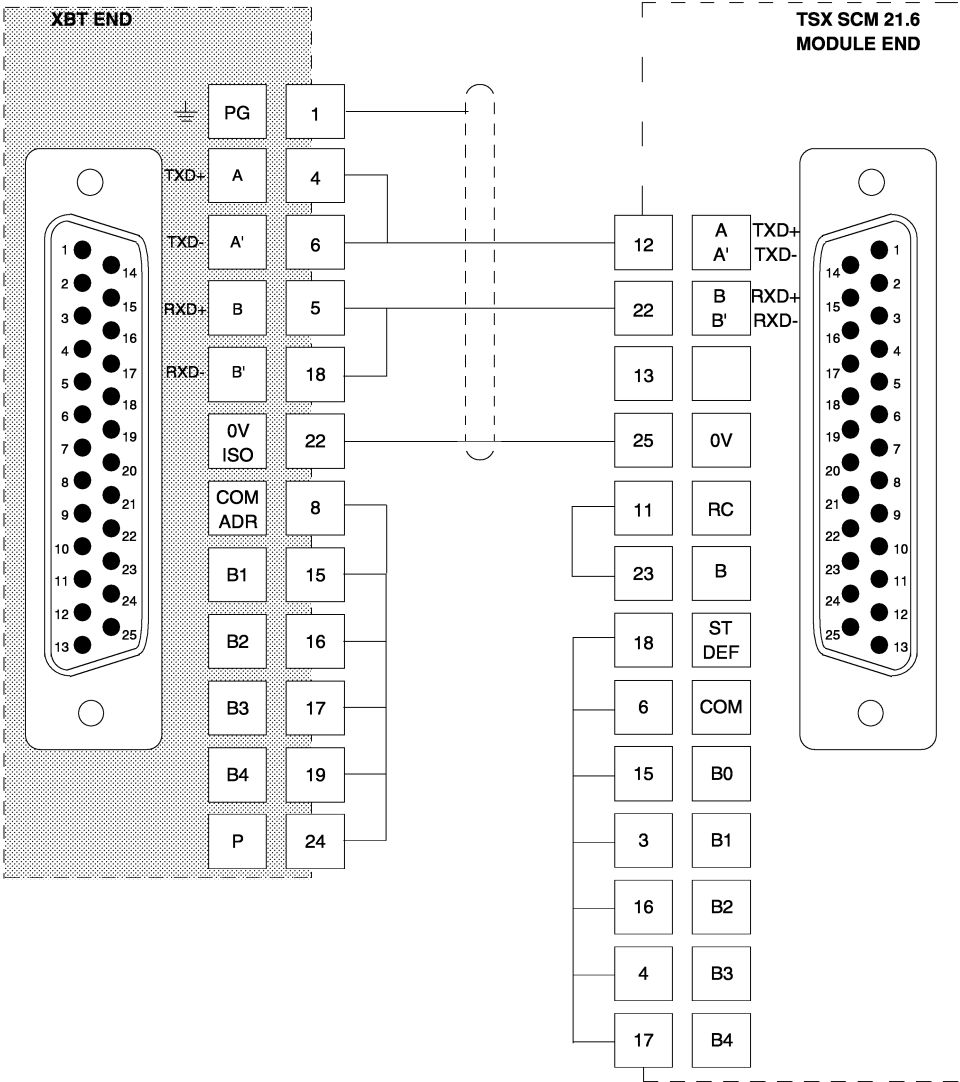


XBT-Z905 cable connection: XBT-Z905 ref. nbr. end to XBT terminal.

THE ADDRESSES AUTOMATICALLY SET BY THE XBT-Z918 CABLE ARE:
0 FOR THE TSX SCM 21.6 MODULE
1 FOR THE XBT--8 TERMINAL

**Connecting to a Uni-Telway Bus
XBT-B8/C8 to TSX SCM 21.6 Connection**

XBT-Z918 Connector pin arrangement
(cable fitted with two 25-pin male Sub-D connectors).

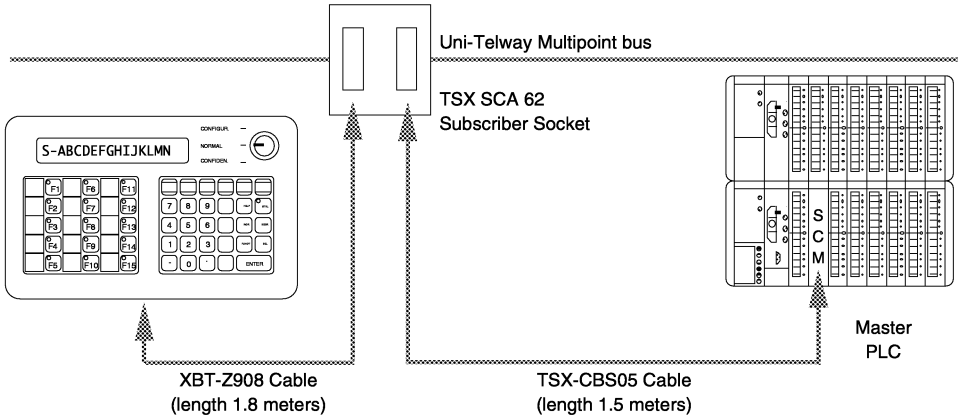


Connecting to a Uni-Telway Bus

8.9.2 XBT-B8/C8 to TSX SCA 62 Subscriber Socket Connection

When connecting a XBT-B8/C8 terminal to a multipoint Uni-Telway bus via a TSX SCA 62 subscriber socket, use a 1.8 meter length XBT-Z908 cable.

THE ADDRESS CODING FOR THE XBT TERMINAL IS SET ON THE MICRO-SWITCHES LOCATED IN THE TSX SCA 62 SUBSCRIBER SOCKET



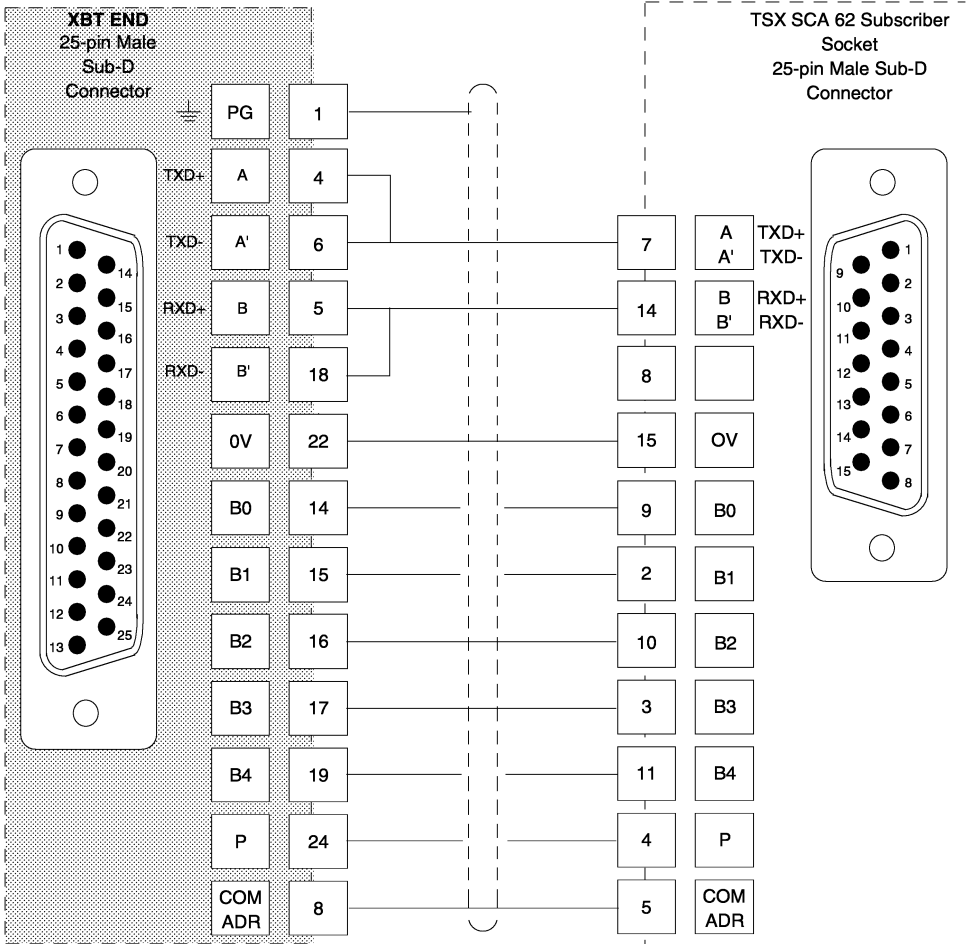
Making this connection will automatically set the configuration for the TSX SCM 21.6 module.

The coding set in the TSX SCA 62 subscriber socket is 0 for the data link to the TSX SCM 21.6 module.

X corresponds to the address assigned to the XBT terminal (for the data link to the XBT).

Connecting to a Uni-Telway Bus
XBT-B8/C8 to TSX SCA 62 Subscriber Socket Connection

XBT-Z908 Cable pin arrangement
 (cable fitted with male connectors).



8.10 Printer Connection

THIS SUB-SECTION ONLY APPLIES TO XBT-B8141 AND XBT-C8251 TERMINALS EQUIPPED WITH A PRINTER INTERFACE.

The printer interface can be set to operate as and RS-232C / V24 serial interface or as a parallel interface.

8.10.1 RS-232C Serial Link Connection

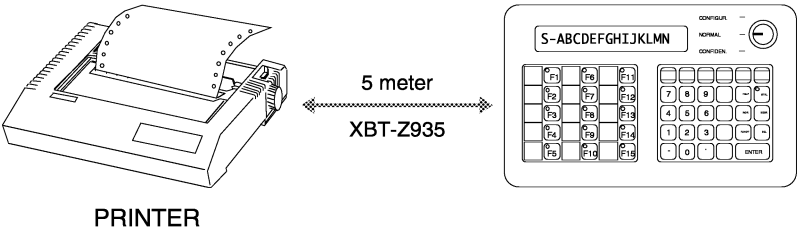
- without support for RTS, CTS, DSR, DTR control signals,
- with support for Modem RTS, CTS, DSR, DTR control signals.

THE MAXIMUM DISTANCE BETWEEN THE XBT TERMINAL AND THE PRINTER IS 15 METERS.

Connection: 3 shielded twisted pairs of at least 0.34 mm² AWG22 gauge.

MAX. TRANSMISSION SPEED 9600 BAUD

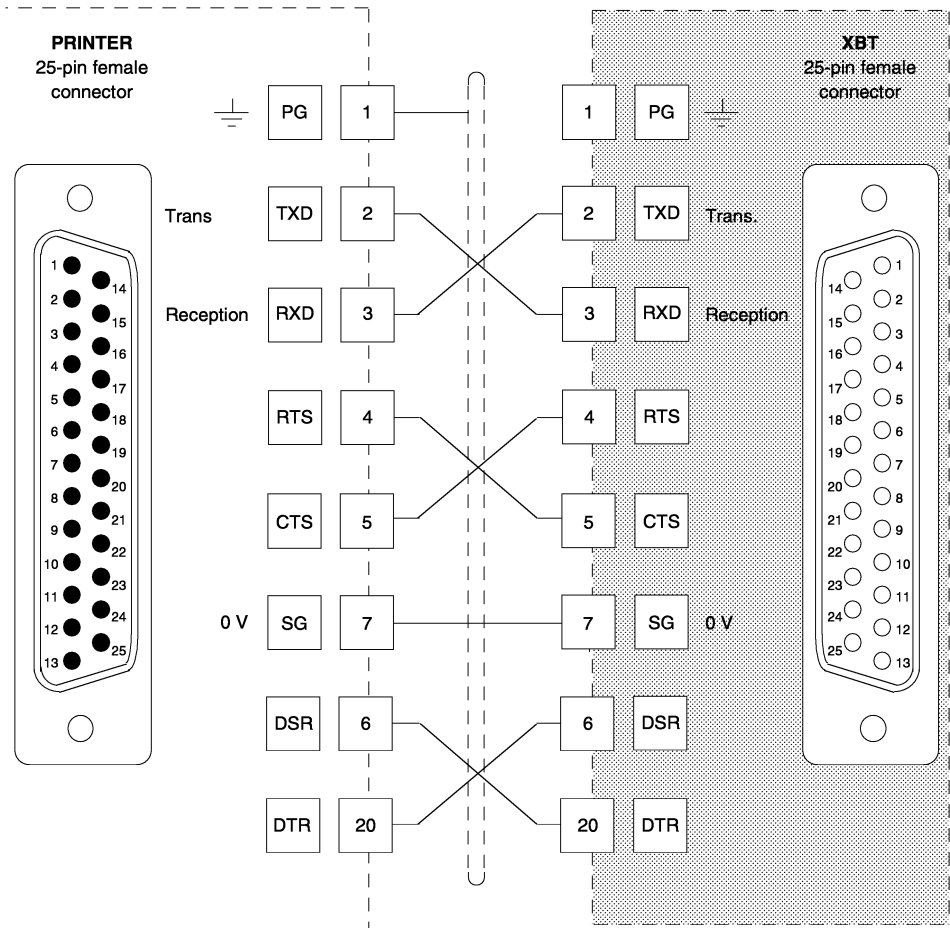
The 5 meter length XBT-Z935 cable can be used for RS-232C or RS-232 Modem connection with the printer.



Printer Connection
RS-232C Serial Link Connection

XBT-Z935 Cable pin arrangement

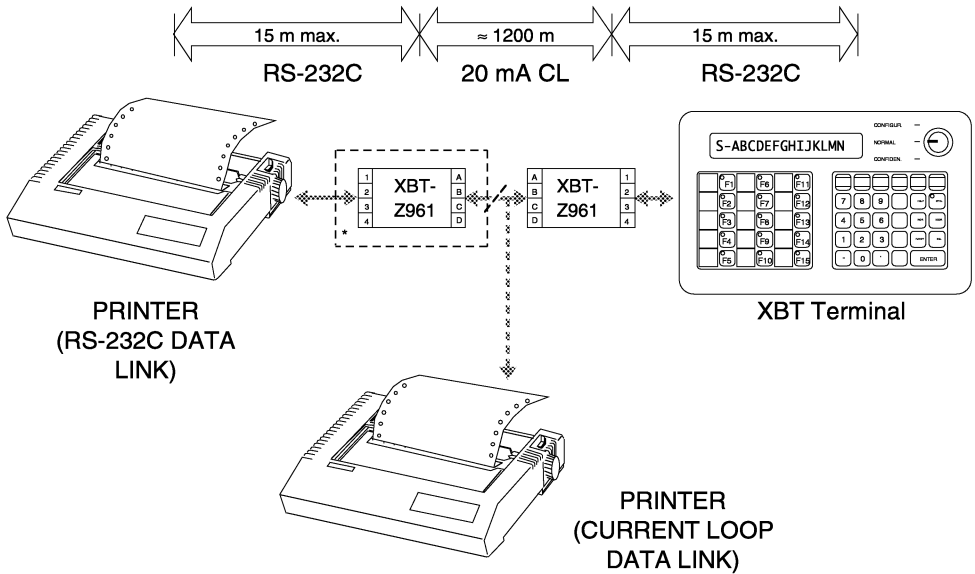
(Cable fitted with a 25-pin Sub-D female connector on the XBT end and a 25-pin male Sub-D connector on the printer end).



Printer Connection

8.10.2 Remote Printer Connection

In some applications, the printer may need to be located a considerable distance away from the XBT terminal (more than 15 meters away). In this case, use the XBT-Z961 RS-232C / 20 mA CL converter. Transmission will be performed in 20 mA current loop mode, enabling the printer to be located up to 1200 meters away, once the transmission speed has been set.



THE USE OF XBT-Z961 MODULES RESTRICTS THE MAXIMUM TRANSMISSION RATE TO 4800 BAUD.

THE PRINTER LINE MUST BE CONFIGURED FOR ORDINARY RS-232C CONNECTION.

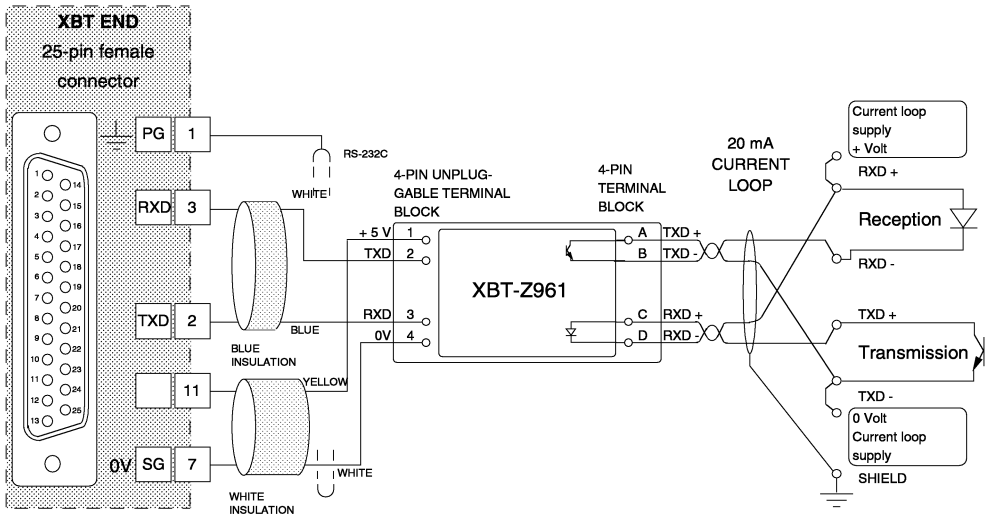
Printer Connection Remote Printer Connection

XBT-Z961 converter connection

- Terminal to XBT-Z933 converter cable, length 2.50 meters.

THE TERMINAL PROVIDES THE 5 VOLT SUPPLY REQUIRED BY THE RS-232 SERIAL LINK (BETWEEN THE TERMINAL AND THE XBT-Z961 CONVERTER) MAX. DATA FLOW 80 mA.

• XBT-Z933 cable pin arrangement



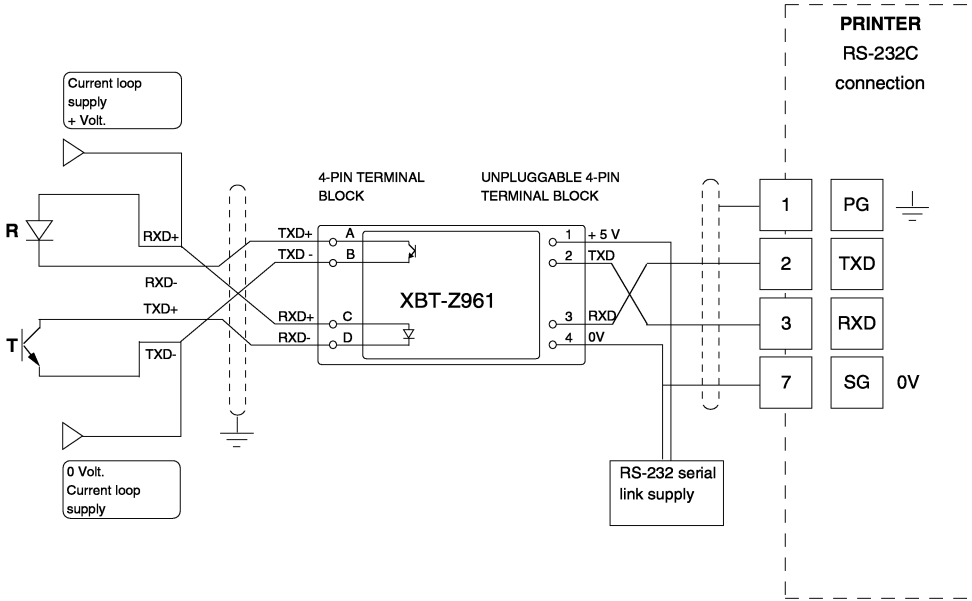
BE SURE TO FOLLOW THE WIRE COLOR CODING AT THE CONVERTER END.

AN EXTERNAL POWER SUPPLY TO THE CURRENT LOOP IS REQUIRED:

10 V < V < 30 VDC, 50 mA

Printer Connection
Remote Printer Connection

• Converter to printer connection



The length of the data link between the XBT-Z961 and the Printer can be up to 15 meters max. using a 3-wire shielded connection of 0.32 mm² AWG22 gauge min.

IN RS-232 MODE, THE MODULE MUST BE SUPPLIED:

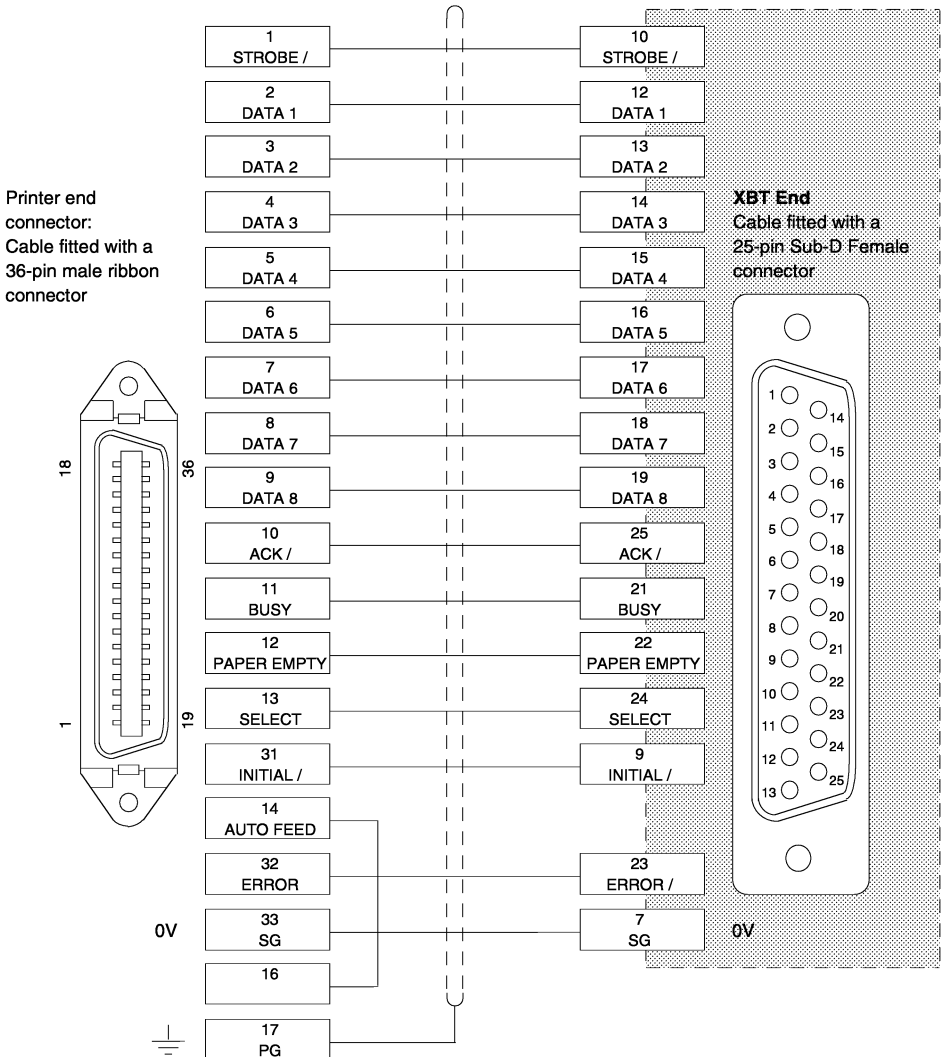
$$U = 5 \text{ V} \begin{pmatrix} +0,6 \text{ V} \\ -0,2 \text{ V} \end{pmatrix} 30 \text{ mA}$$

Printer Connection

8.10.3 Parallel Data Link

The parallel data link between the XBT terminal uses a 1.8 meter length XBT-Z934 cable.

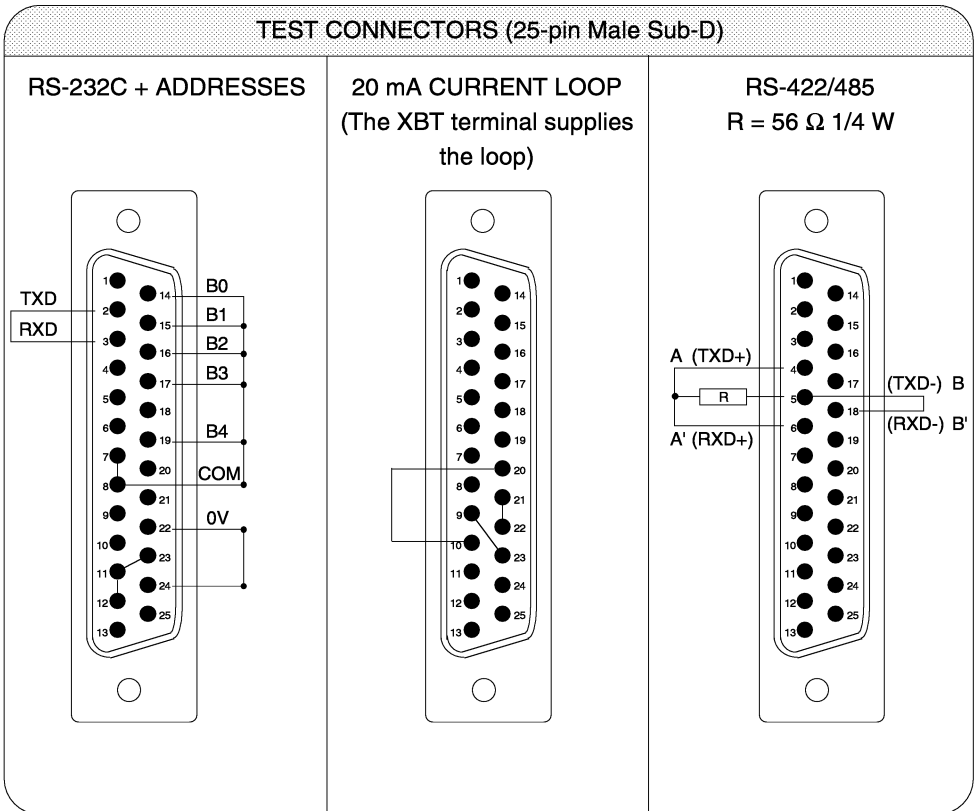
Pin arrangement:



8.11 Test Connectors

With the keyswitch in the Confidential position, selecting the Tests procedure enables a test to be performed for correct operation of the XBT-B... / C... terminals, and especially to test the physical links and their addresses.

Before selecting the Address test or a test of one of the data links (RS-232C, 20 mA CL or RS-422), ensure that the appropriate test connector has been fitted to the serial port of the XBT terminal.



9.1 Messages Displayed

• Self-tests

When the XBT terminal is powered-up, a series of self-tests are performed automatically. These tests can also be run in Confiden. mode using the Self-test procedure (refer to sub-section 4.3.3).

TEST	DISPLAY	DESCRIPTION
PROM	<div data-bbox="328 646 613 678">*****</div> <div data-bbox="337 753 603 786">CHECK. PROG XXXX</div> <div data-bbox="353 889 587 922">XBT-.8..1 VX.X</div> <div data-bbox="326 993 610 1062">> CLOCK-CAL FAULT < on XBT-C...</div>	<p data-bbox="638 652 943 711">Internal fault if the display is permanent.</p> <p data-bbox="638 756 975 850">Internal software fault. Permanent display = return the device for servicing.</p> <p data-bbox="638 893 1030 919">Brief display of the software version.</p> <p data-bbox="638 997 989 1091">Clock-calendar fault. Pressing ENTER releases the terminal.</p>
MESSAGE MEMORY	<div data-bbox="337 1136 603 1234">> EEPROM FAULT < on XBT-B8141 and XBT-C8251</div> <div data-bbox="337 1312 603 1344">MODE = NORMAL</div>	<p data-bbox="638 1136 989 1263">Message memory fault. Permanent blinking display Pressing ENTER releases the terminal.</p> <p data-bbox="638 1308 966 1403">The XBT terminal displays the operating mode (key in NORMAL position).</p>

Messages Displayed

• General messages




MESSAGE DISPLAYED	OPERATING MODE	PROBABLE CAUSE	CORRECTIVE ACTION
> LINE FAULT <	MODE = NORMAL MODE = CONFIDEN. Adjust protocol	Failure on the line between the PLC and the XBT terminal.	-Check the cable between the XBT terminal and the PLC. -Test the XBT serial port (see sub-section 4.3.2.). -Test the PLC programming port with a TSX T407 terminal.
> TSX DATA FAULT <	MODE = NORMAL MODE = CONFIDEN. Adjust protocol	Data not available from the PLC or Request rejected by the PLC.	-Check that the program cartridge is adequate for the TSX configuration. -Repeat the operation E.g.: write W500 to TSX 27
> XBT DATA FAULT <	MODE = NORMAL MODE = CONFIDEN. Adjust protocol	Impossible to execute request.	-Check the message in the XBT E.g.: message not or incorrectly programmed.
> OVERFLOW <	MODE = NORMAL MODE = CONFIDEN.	Value entered from the keyboard and corrected by the conversion factor is greater than the maximum value allowed for a word.	-Check the conversion factor. -Check the format of value entered from the keyboard.
> PROG. ERROR<	MODE = CONFIGUR. (store messages)	Message incorrectly written into memory.	-Check message syntax (see sub-section 5.5.2).
> NO MESSAGE <	MODE = NORMAL MODE = CONFIDEN.	No message stored at address XXX.	-Program the message -Change the command address.

Messages Displayed

• Specific XBT-B8/C8 Messages

MESSAGE DISPLAYED	OPERATING MODE	PROBABLE CAUSE	CORRECTIVE ACTION
> LINE FAULT <	MODE = NORMAL MODE = CONFIDEN. UNI-TE Protocol	- Failure in the serial link between the XBT and the TSX SCM 21.6 module. The Uni-Telway device number set for the XBT terminal is greater than the maximum declared in the TSX SCM 21.6 module.	- Check the cable between the XBT and TSX SCM 21.6 - Test the XBT's serial interface (see sub-section 4.3.3). - Check the configuration of the TSX SCM module (refer to TSX SCM 21.6 Installation Manual (Ref. Nbr. TSX D24005E).
> TSX FAULT<	MODE = NORMAL MODE = CONFIDEN. UNI-TE Protocol	No response to the request from the XBT terminal: Incorrect Uni-Telway parameters corresponding to a nonexistent or failed device.	Check Uni-Telway parameters: Network Nbr. Station Nbr. Gate Nbr. Module Nbr. Channel Nbr. in Serial Link Configuration Mode (see sub-section 4.1.2).


• Specific XBT-B8141 and XBT-C8251 Messages

MESSAGE DISPLAYED	OPERATING MODE	PROBABLE CAUSE	CORRECTIVE ACTION
*** ***(in the numerical field)	MODE = NORMAL MODE = CONFIDEN.	Value greater than the maximum value allowed in the numerical field.	- Check the length of the numerical field - Check the conversion factor
> EEPROM FAULT <	MODE = CONFIGUR. Store messages	Power-down during the procedure.	Press  to validate
> LOG FAULT < (blinking)	MODE = NORMAL MODE = CONFIDEN.	Incoherent storage cause by a RAM fault or interference.	Press  to acknowledge Printing of the log continues after acknowledgement.
> PRINTER FAULT < (blinking)	MODE = NORMAL MODE = CONFIDEN.	In automatic ("continuous" mode), message not printed because of a RAM fault.	Press  to acknowledge Printing continues after acknowledgement.

Messages Displayed

• **Printer fault messages (XBT-B8141 and XBT-C8251)**

Printer operation errors are indicated by an error code and the buzzer of the XBT terminal sounds.

MESSAGE DISPLAYED	OPERATING MODE	PROBABLE CAUSE	CORRECTIVE ACTION
PRINTER FAULT 00 (blinking)	MODE = NORMAL MODE = CONFIDEN.	Fault ends	To acknowledge  press
PRINTER FAULT 02 (printer RS-232C serial interface)		No DSR signal (RS-232C printer, Modem)	Check the data link between the XBT terminal and the printer
PRINTER FAULT 03 (printer RS-232C serial interface)		DSR signal present but no CTS signal (RS-232C printer, Modem)	Check the data link between the XBT terminal and the printer
PRINTER FAULT 04 (printer RS-232C serial interface)		Time-Out fault	Refer to the manual supplied with the printer
PRINTER FAULT 05 (printer parallel interface)		Cable between the XBT terminal and the printer is disconnected	Check the cable between the XBT terminal and the printer
PRINTER FAULT 06 (printer parallel interface)		Printer powered-down	Power-up the printer
PRINTER FAULT 07 (printer parallel interface)		Printer fault	Refer to the manual supplied with the printer
PRINTER FAULT 08 (printer parallel interface)		No paper	Replenish printer paper
PRINTER FAULT 09 (printer parallel interface)		Printer Off-line	Reset the printer On-Line
PRINTER FAULT 10		BUSY fault	

ALL PRINTER FAULTS ARE ACKNOWLEDGED BY PRESSING



9.2 Messages Sent on the Line

MESSAGE	OPERATING MODE	PROBABLE CAUSE	REMEDIAL ACTION
ESC @ LF CR	MODE = NORMAL MODE = CONFIDEN.	Transmission fault - Parity error	- Check the line parameters (reduce the speed) - Check the line for interference (install an opto-isolator) Shield the cable
ESC ? LF CR	MODE = NORMAL MODE = CONFIDEN.	- Syntax error	Check command syntax
	ASCII MULTIPOINT	Address error found	Check address coding
ESC \$ LF CR	MODE = NORMAL MODE = CONFIDEN.	Terminal not ready	Check: - if operator response time is allowed (LED 6 lit) - if buffer register full (LED 5 lit) Acknowledge by ENTER
ESC PROG. ERROR LF CR	MODE = CONFIGUR. Store messages	Syntax error when the message was written	- Check syntax - Rewrite the message
ESC ! LF CR XBT-B8141 XBT-C8251	MODE = NORMAL MODE = CONFIDEN.	On-line printer error not acknowledged	Press ENTER to acknowledge the fault, or send command ESC Z [LF] CR to cancel the delay time for operator response.

10.1 Uni-TE Requests for XBT-B8/C8 Terminals

The XBT terminal Server function.

The XBT-B8/C8 supports the following UNI-TE requests:

- Identification
- Protocol Version
- Mirror
- Status
- Self-Test
- Init

These requests enable access to data that are specific to the Uni-Telway protocol.

10.1. Identification Request

Enables the Client (or Sender) to identify the terminal (Product type, Software version, Reference number).

Request format:

Request Code	Category Code
Hex. 0F	0 → 7

Confirm format:

Confirm Code	Product Type	Sub-type	Product Version	Data
Hex. 3F	Hex. 30			ASCII Character String

- Sub-type: coded in 1 byte in Hex.: 0 for XBT-B8140
 20 for XBT-C8250
- Product version: coded in 1 byte (2 BCD nibbles) XY in Hex.
 XY = software version
- Data: ASCII character string preceded by an 'XBT-B8140' or 'XBT-C8250' length byte.

Uni-TE Requests for XBT-B8/C8 Terminals

10.1.2 Protocol Version

Enables the Client (or Sender) to identify the terminal.

Request format:

Request Code	Category Code	Max. mess. length	Length	Version
Hex. 30	0 → 7	1 word	1 byte	2 BCD nibbles

Confirm format:

Confirm Code	Max. message size	Length (Nbr. of versions supported).	Supported Version	Request File Size
Hex. 60	20 bytes	01	1 byte (2 BCD nibbles) Hex. 10	0

10.1.3 Mirror

Tests the system and communication path.
The Client sends a sequence and the Server returns it to the Client.

Request format:

Request Code	Category Code	Data
Hex. FA	0 → 7	Byte string

Confirm format:

Confirm Code	Data
Hex. FB	String of bytes sent by the request

Uni-TE Requests for XBT-B8/C8 Terminals

10.1.4 Status

The response from the Server comprises a standard status message with information on terminal status.

Request format:

Request Code	Category Code	Data Required
Hex. 31	0 → 7	0

Confirm format:

Confirm Code	Current Status	Status Mask
Hex. 61	1 byte	60

Current state: bit 0
 bit 1
 bit 2
 bit 3
 bit 4
 bit 7

} reserved

bit 5 at 1: terminal awaiting operator response

bit 6 at 1: no action in progress (cyclic refresh or awaiting operator response).

Uni-TE Requests for XBT-B8/C8 Terminals

10.1.5 Self-Test

Tests the RAM memory of the XBT terminal and the Clock/Calendar function when an XBT-C8... is used.

Request format:

Request Code	Category Code	Type of test
Hex. 32	0 → 7	0

Report format:

Confirm Code	Result
Hex. 62	

Result: 0 => No faults,
 1 => Terminal RAM fault,
 4 => Clock/Calendar fault (XBT-C8...).

10.1.6 Init

Enables XBT initialization and stops all action in progress (cyclic refresh and cancels waiting for an operator response).

Request format:

Request Code	Category Code
Hex. 33	0 → 7

Confirm format:

Confirm Code	Result
Hex. 63	

Result: 0 initialization performed.

10.1.7 H'FC' Request (unsolicited data):

Usage of these requests with PLC text blocks are described in sub-sections 6.1.3 and 6.5.

10.2 Command Execution Time from Message Reception by the Terminal

These times are given as an indication only.

COMMANDS	DESCRIPTION	Time in ASCII (ms)	Min. time in Adjust (ms)
B	BUZZER	1	2
C	LEDs	2	5
C99	LEDs	2	5
E	TERMINAL STATUS	1	3
F99	LOCK KEYS	2	5
H	CLOCK/CALENDAR	25	30
L	READ THE TEXT OF A STORED MESSAGE	7	10
Q	READ THE TRANSMISSION REGISTER	1	3
R	DISPLAY A MESSAGE AND AWAIT AN OPERATOR RESPONSE	150	150
S	RELAY	1	2
V	DISPLAY A STORED MESSAGE	150	150
T	DISPLAY A TEXT	200-500	200-500
Z	CANCEL AN OPERATOR RESPONSE REQUEST	25	30

Notes:

In Adjust mode, the time taken depends on the workload of the PLC.
The times shown do not include line transmission times.

10.3 ASCII Character Table

(ASCII: American Standard Code for Information Interchange).

BINARY				HEXADECIMAL								
				b ₆	0	0	0	0	1	1	1	1
				b ₅	0	0	1	1	0	0	1	1
				b ₄	0	1	0	1	0	1	0	1
b ₃	b ₂	b ₁	b ₀	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC ₁	!	1	A	Q	a	q
0	0	1	0	2	STX	DC ₂	"	2	B	R	b	r
0	0	1	1	3	ETX	DC ₃	#	3	C	S	c	s
0	1	0	0	4	EOT	DC ₄	\$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(8	H	X	h	x
1	0	0	1	9	HT	EM)	9	I	Y	i	y
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z
1	0	1	1	B	VT	ESC	+	;	K	[k	{
1	1	0	0	C	FF	FS	,	<	L	\	l	l
1	1	0	1	D	CR	GS	-	=	M]	m	}
1	1	1	0	E	SO	RS	.	>	N	^	n	~
1	1	1	1	F	SI	US	/	?	O	_	o	DEL

control characters

displayable characters

characters displayed by XBT

10.4 Displayable Character Table

The characters that can be displayed by XBT-B8 and C8 terminals correspond to ASCII codes from 20(H) to 5F(H).

MSB: Most Significant Bits.

LSB: Least Significant Bits.

MSB \ LSB	2	3	4	5
0		∩ ∩	⊗	∩ ∩
1	∩ —		∩ ∩	∩ ∩
2	"	∩ ∩	∩ ∩	∩ ∩
3	∩ ∩	∩ ∩	∩ ∩	∩ ∩
4	∩ ∩	∩ ∩	∩ ∩	∩ ∩
5	∩ ∩	∩ ∩	∩ ∩	∩ ∩
6	∩ ∩	∩ ∩	∩ ∩	∩ ∩
7	/	∩ ∩	∩ ∩	∩ ∩
8	< \	∩ ∩	∩ ∩	∩ ∩
9	< /	∩ ∩	∩ ∩	∩ ∩
A	∩ ∩	∩ ∩	∩ ∩	∩ ∩
B	∩ ∩	∩ ∩	∩ ∩	∩ ∩
C	•	∩ ∩	∩ ∩	∩ ∩
D	--	--	∩ ∩	∩ ∩
E	•	∩ ∩	∩ ∩	∩ ∩
F	/	∩ ∩	∩ ∩	∩ ∩

10.5 Checksum Calculation

Example of the transmission of a display request ESC V12 + 3 LF CR (with checksum).

Calculation of the corresponding checksum (Exclusive OR).

CHARACTERS	HEXADECIMAL CODE	BINARY CODE							
		b7	b6	b5	b4	b3	b2	b1	b0
ESC	1B	0	0	0	1	1	0	1	1
V	56	0	1	0	1	0	1	1	0
1	31	0	0	1	1	0	0	0	1
2	32	0	0	1	1	0	0	1	0
+	2B	0	0	1	0	1	0	1	1
3	33	0	0	1	1	0	0	1	1
LF	0A	0	0	0	0	1	0	1	0
CR	0D	0	0	0	0	1	1	0	1
RESULTING CHECKSUM	Q	0	1	0	1	0	0	0	1

In 7-bit format forcing bit 6

Q	51	0	1	0	1	0	0	0	1
----------	-----------	----------	----------	----------	----------	----------	----------	----------	----------

Message sent: ESC V 12 + 3 Q LF CR

In 8-bit format forcing bit 7

EXTENDED ASCII	D1	1	1	0	1	0	0	0	1
-----------------------	-----------	----------	----------	----------	----------	----------	----------	----------	----------

Message sent:

1BH 56H 01H 02H 2BH 33H D1H 0AH 0DH

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