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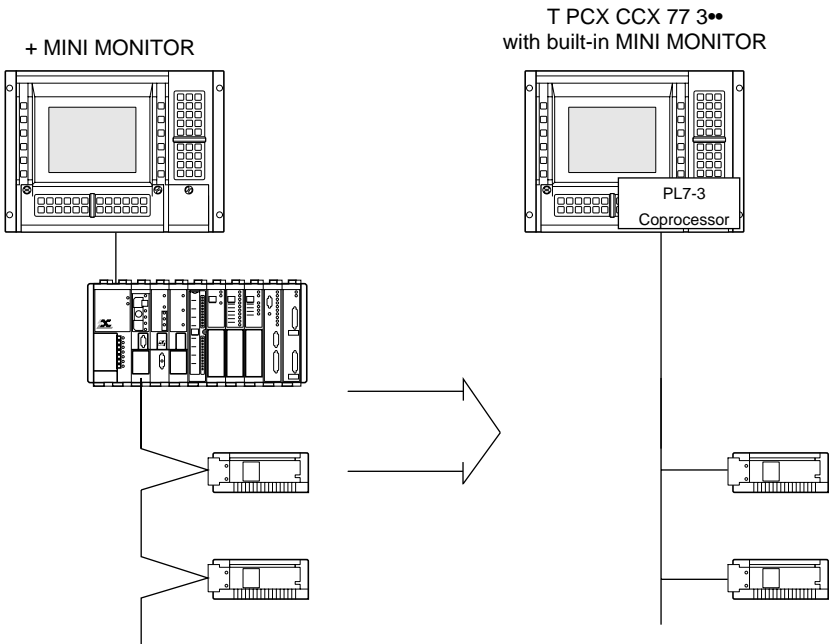
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## 1.1 Definition

The integrated PLC/PC system, product ref. T PCX CCX 77 3•• is based on:

- A CCX 77 FR cell controller (486 DX2 66 MHz microprocessor, 210 MB minimum hard disk, 8 MB RAM with reflex action function keys),
- A full-length IBM PC-AT (ISA bus) standard PL7-3 coprocessor board.

This system forms a compact product that integrates a control system and a PLC processor.



**Note:**

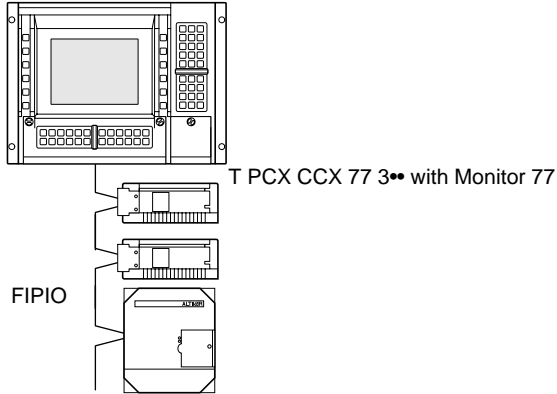
A non-integrated version of the T PCX 87 455• coprocessor designed for desktop control systems can be installed in an FTX 507 terminal or in a PC compatible microcomputer (386 SX 16 MHz minimum microprocessor, power supply with 2A available on its 5V circuit).

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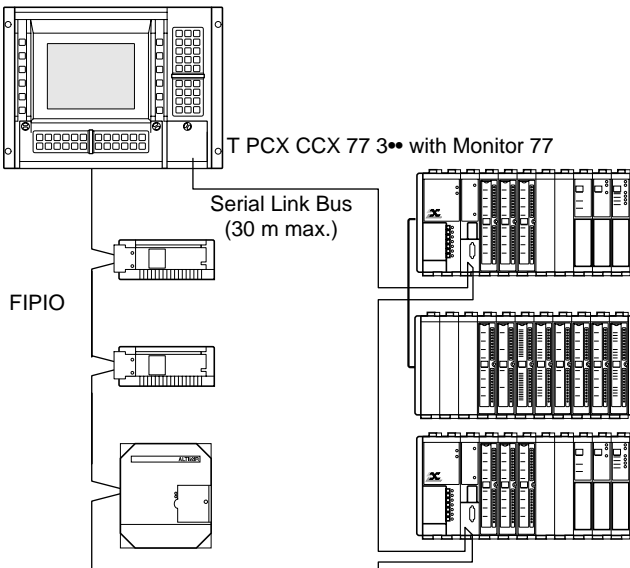
## 1.2 Typical Configurations for a Standalone Machine

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- A first requirement for this type of application is for all I/O to be totally installed remotely, as close as possible to the machine (up to 1000 meters).



- A second requirement is the ability to select a mix between some remote I/O and centralizing the rest of the I/O (axis control, asynchronous serial link, etc.)



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### 1.3 PL7-3 Coprocessor Range

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Three configurations are available:

- Two integrated systems for T PCX CCX 77 31•/CCX 77 33• systems,
- One PL7-3 T PCX 87 455 coprocessor for installation in a desktop system.

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#### 1.3-1 Console Control Station T PCX CCX 77 31•

This configuration comprises:

- A CCX 77 FR (T CCX 77 FR 8C3) system comprising an STN 8 1/2" color screen, an 80486 DX2 microprocessor with a 66 MHz clock speed, a 210 Mb minimum hard disk, 8 Mb of RAM, 12 tactile feedback control keys and a European standard power cord.
- A PMX 87 455 (T PCX 87 455) PL7-3 coprocessor with 352 Kwords of backed-up memory and a built-in FIPIO/FIPWAY data link, installed in a full-length extension slot in the ISA extension bus in the CCX 77 FR system.
- MS-DOS 6.• and IBM OS/2 3.• Warp Red operating systems installed on the hard disk + WINDOWS 3.1.
- V52 level terminal link drivers (TSX LF TP V52) for DOS and OS/2, installed on the hard disk and TXT LF TPV52.
- A set of 3 1/2" diskettes comprising:
  - A library of UNI-TE requests for the terminal link for use with DOS and OS/2 (ref. TSX LF TP UNI-TE).
  - A library of UNI-TE requests for the terminal link for use with WINDOWS 3.1• and 95 (ref. TLX LF TP UNI-TE).
  - DDE server for the terminal link for use with WINDOWS 3.1• and 95 (ref. TSX LF TP DDE).
  - DOS and OS/2 utilities for CCX 77 FP.
- A set of technical manuals including the:
 

- CCX 77 User's Manual	Ref. T CCX DM 77 2•
- TSX/PMX Model 40 Installation Manual	Ref. TSX DM PR40•
- PL7-3 Coprocessor Installation Manual	Ref. TSX DM PCX V52•
- FIPIO/FIPWAY Reference Manual	Ref. TSX DR FPW•
- TBX Remote I/O Installation Manual	Ref. TSX DM TBX V52•
- FIPIO/FIPWAY Data Link Installation Manual	Ref. TSX DM FPP•
- UNI-TE Terminal Link Library User's Manual	Ref. TSX DM TP UNITE•
- DDE Terminal Link Server User's Manual	Ref. TSX DM TP DDE•

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### 1.3-2 Console Control Station with MONITOR 37• (TPCX CCX 77 33)

- A CCX 77 FR system with STN 8"1/2 color screen, 80486 DX2 processor 66 MHz , 210 Mb minimum hard disk, 8 Mb RAM with 12 tactile feedback control keys (ref. T CCX 77 FR 8C3), and European power cord.
- A PMX 87 455 PL7-3 coprocessor, with 352 Kwords of backed-up memory and a built-in FIPIO/FIPWAY interface (ref. T PCX 87 455), installed in a full length ISA bus slot in the CCX 77 FR terminal.
- MS.DOS 6.• and DESQview operating systems installed on the hard disk
- V52 level terminal link drivers for DOS (ref. TSX LF TP V52) installed on the hard disk
- DOS and OS/2 utilities for CCX 77 FP
- A set of technical manuals including the :
  - CCX 77 User's Manual Ref. T CCX DM 77 2•
  - TSX/PMX Model 40 Installation Manual Ref. TSX DM PR40•
  - PL7-3 Coprocessor Installation Manual Ref. TSX DM PCX V52•
  - FIPIO/FIPWAY Reference Manual Ref. TSX DR FPW•
  - TBX Remote I/O Installation Manual Ref. TSX DM TBX V52•
  - FIPIO/FIPWAY Data Link Installation Manual Ref. TSX DM FPP•
- Monitor 37 runtime version TSX M37 RT1 LV52

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### 1.3-3 Coprocessor for a Terminal Control Station T PCX 87 455• PL7-3

This coprocessor is designed for installation in an FTX 507 terminal, a CCX 77 controller or a PC compatible microcomputer with at least a 386 SX microprocessor with a 16MHz clock speed and 2A available from the 5V power supply.

This package comprises:

- A PMX 87 455 PL7-3 coprocessor for PCs with 352 Kwords of memory (not battery backed) and a built-in FIPIO/FIPWAY interface Ref. T PCX 87 455 PC
- A set of technical manuals including the:
  - TSX/PMX Model 40 Installation Manual Ref. TSX DM PR40•
  - PL7-3 Coprocessor Installation Manual Ref. TSX DM PCX V52•
  - FIPIO/FIPWAY Reference Manual Ref. TSX DR FPW•
  - TBX Remote I/O Installation Manual Ref. TSX DM TBX V52•
  - FIPIO/FIPWAY Data Link Installation Manual Ref. TSX DM FPP•
  - UNI-TE Terminal Link Library User's Manual Ref. TSX DM TP UNITE•
  - DDE Terminal Link Server User's Manual Ref. TSX DM TP DDE•
- A set of 3 1/2" diskettes comprising:
  - A library of UNI-TE requests for the terminal link for use with DOS and OS/2 (ref. TSX LF TP UNI-TE).
  - A library of UNI-TE requests for the terminal link for use with WINDOWS 3.1• and 95 (ref. TLX LF TP UNI-TE).
  - DDE server for the terminal link for use with WINDOWS 3.1• and 95 (ref. TSX LF TP DDE).
  - V52 level terminal link drivers for DOS and OS/2 (ref. TSX LF V52 and TXT LF TP V52)

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## 2.1 Definition

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The PL7-3 coprocessor PL7-3 is identified, configured, programmed and set-up from an X-TEL or MINI X-TEL version  $\geq$  V5 or later software workshop in the same way as a T PMX 87 455 processor.

**From XTEL-CONF, declare: Processor PMX 87 455**

Applications written for a T PMX 87 455 can be transferred to and executed by a PL7-3 coprocessor with the following differences:

- Do not configure any I/O modules in racks 0/1 and 2/3 (local I/O are not available).
- In all cases, configure a 256 KWord RAM cartridge (on-board memory available in the PL7-3 coprocessor). Do not select the "Prom" option.

Dialog on the ISA bus, between the PL7-3 coprocessor and the CCX 77 FR processor is performed via an emulation of the terminal link (serial link at 19.2 kbits/s).

The PL7-3 coprocessor programming functions are accessed via:

- PL7-3 in the software workshop (MINI X-TEL or X-TEL) installed in the T PCX CCX 77 3 station,
- PL7-3 in the software workshop (MINI X-TEL or X-TEL) installed in an FTX 417/507 terminal connected to the PL7-3 coprocessor via a data link using the built-in FIPIO bus interface.

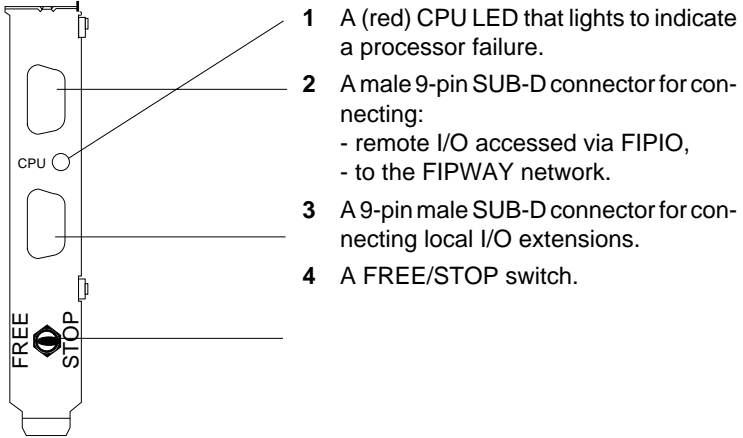
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## 2.2 PL7-3 Coprocessor Description

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### 2.2-1 Physical Presentation

The PL7-3 coprocessor is a standard PC-AT ISA bus format extension board. It requires a full length slot in the PC extension bus. On the front panel it comprises:



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### 2.2-2 Memory Back-up

- The built-in RAM and the program memory are battery backed (6 weeks endurance) only in the **integrated T PCX CCX 77 3\*\* product**.
- Real-time clock, battery backed only in the **integrated T PCX CCX 77 3\*\* product**.

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### 2.2-3 Local and/or Remote Bus

Two interfaces are available:

- The serial I/O bus: controls all of the local extension racks (except racks 0/1 and 2/3 that are not available).
- The FIPIO serial bus: controls the remote I/O (it can be used as a communication network between PLCs connected to FIPWAY).

Note:

A long distance optical or electrical remote link is not available.



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### 2.2-4 Memory Layout

The memory layout is identical to that of TSX/PMX Model 40 processors, and comprises:

- A 4 Kbit memory (system bits, discrete I/O bits, Grafcet bits, macro steps, internal bits).
- A 96 Kword RAM (data, program, constants).
- A 256 Kword RAM (program, constants).

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### 2.2-5 Software Layout

The software layout is identical to that of TSX/PMX Model 40 processors, and comprises:

- A MAST task,
- A FAST task,
- Four auxiliary tasks, AUX0 to AUX3,
- An IT task.

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### 2.2-6 FREE/STOP Switch

The PL7-3 coprocessor is equipped with a switch used to control application operating modes.

- FREE → STOP:  
The PL7-3 coprocessor is forced to STOP if it was previously set to RUN.  
No RUN command will be accepted.
- STOP → FREE:  
When the switch is set to the FREE position, a RUN command will start the PL7-3 coprocessor running. This command can come from:
  - The software workshop installed on the control system, or
  - An FTX terminal connected via the FIPIO bus to the control system.

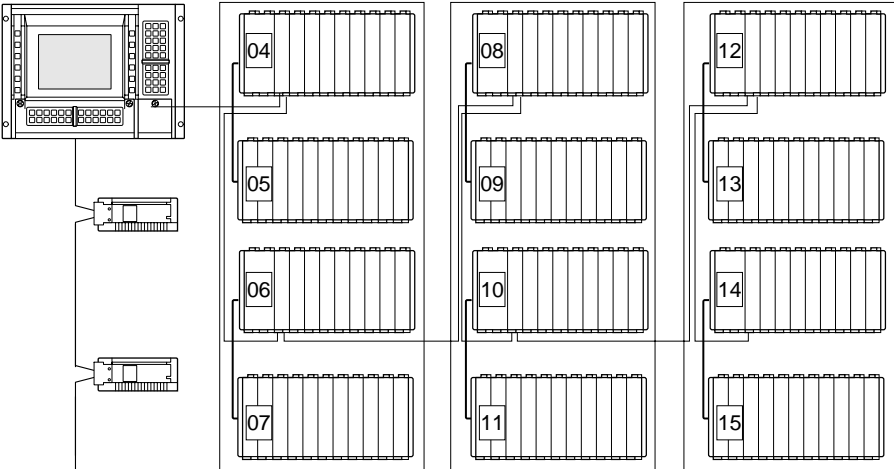
## 2.3 Characteristics

### 2.3-1 Functional Characteristics

Characteristics	PL7-3 Coprocessor
Number of discrete I/O Number of intelligent modules Network interfaces FIPIO/FIPWAY UNI-TELWAY TELWAY ETHWAY/MAPWAY OSI 802.3/802.4	1536 + remote I/O on FIPIO bus 32  Built-in Yes (unimportant for this type of application) No No No
Process control Number of typical loops Execution time	 32 3 ms
Memory Maximum size Internal RAM Built-in user RAM	 352 Kwords 96 Kwords (*) 256 Kwords (*)
Instruction execution time Bit instructions (Bit, not (), Re(),...) Math operations (+, -, *, /) Logical operations (AND, OR,...)	 0.5 $\mu$ s 7 $\mu$ s 6.3 $\mu$ s
Maximum I/O capacity Number of slots Number of racks Addressable rack numbers	 96 12 4 to 15

(\*) battery backed-up memory only available in the T PCX CXX 77 3•• product.

2.3-2 Maximum Configurations for Local I/O



**Note:**  
Racks 0/1 and 2/3 are not available.

---

### 2.3-3 Communication Characteristics

- **FIPIO architecture**

- Compatible with TSX/PMX Model 40 processors,
- Connection of up to a maximum of 64 devices (TBX remote I/O, speed drives, TSX 17-20 PLCs, CCX 17 consoles, FTX 417 or FTX 507 programming terminals, etc.).

- **FIPWAY architecture**

- Compatible with TSX/PMX Model 40 processors,
- Any remote device in the X-WAY layout is able to transparently address the PL7-3 coprocessor.

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## 2.4 Access via X-TEL and Monitor Software

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- The PL7-3 coprocessor station is a single network system (FIPWAY).
- Access to it is transparent for X-TEL and MINI-XTEL software workshop versions V5 or higher.
- No configuration is required via PL7-OSI (MMS interface management) or via PL7-NET (for building multiple network layouts).
- Access is supported via Monitor 77 (DOS) V42 or higher or Monitor 77/2 (OS/2) V4.3 or higher supervisor software using the terminal link driver.

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## 2.5 Performance Levels

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- The internal performance of the PL7-3 coprocessor is equivalent that of a T PMX 87 455 processor.
- The performance of exchanges between the coprocessor and the CCX 77 FR station relies on communication via emulation of the terminal data link on the ISA bus at 19.2 kBits/s.

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## 2.6 Operating Modes (T PCX CCX 77 3\*\*)

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In the integrated system only, the operating modes supported in the event of a power break/return are identical to a TSX/PMX processor system installed in a rack, i.e.:

- **On power break:**  
The CCX 77 FR system power supply generates the PWF and INIT signals that let the PL7-3 processor save the application context in the event of a power break.
- **On power return:**  
The PWF and INIT signals let the PL7-3 processor restore the application context and cause an application hot or cold restart and manage system bits SY0, SY1 or SY2.

For additional information on these two types of restart, refer to the TSX/PMX Model 40 installation manual.

Note:

Micro-cuts in the mains electrical supply are masked by the CCX 77 FR power supply.

**• I/O response in the event of a power break**

Identical to the response of a rack-mounted TSX/PMX PLC:

- The outputs in the rack apply the parameters specified by system bits SY8 and SY9 (hold last value or default to zero),
- The TBX outputs apply the default parameters entered using XTEL-CONF.

**Important**

In other PCs, such as FTX or CCX terminals or PC compatibles, the PWF and INIT signals used in the event of a power break are not controlled by the power supplies. This causes the loss of the application program followed by a cold restart of the application by the PL7-3 processor with forcing of application objects to their initialization value.

The integrated T PCX CCX 77 3•• system is the only one that guarantees a full back-up of the application in the event of a power failure and restarting of the application with the correct context used prior to the power break.

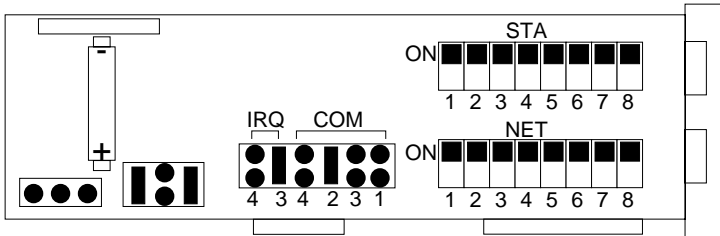
**• Summary of operating modes**

	TSX7/PMX7	T PCX CCX 77 3•• Integrated system	Coprocessor in FTX, CCX, or PC compatible system
Power return	Hot restart	Hot restart	Cold restart (*)
CCX front panel reset	No action	Cold restart	Cold restart (*)
Press <CTRL>/<ALT> /<DEL> keys	No action	No action	No action
Remove program cartridge	Cold restart	X	X

**(\*) Protect the system against power breaks using a UPS, or else the application will be lost in the event of a power break.**

The UNITE library comprises DOS and OS/2 executable programs that can be used for remote up/down loading and starting (setting to RUN) the application corresponding to the MONITOR.M77 file generated by XTEL-CONF.

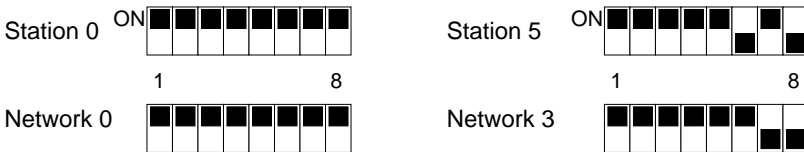
### 3.1 Hardware Configuration



#### FIPIO/FIPWAY Network/Station address coding

The network (NET) and station (STA) address coding is set using two blocks of DIP-switches located on the PL7-3 coprocessor board. DIP-switch 8 is assigned the binary weight 1, DIP-switch 7 the binary weight 2, ... DIP-switch 1, the binary weight 128. A DIP-switch set to ON corresponds to a binary value of 0.

Coding examples:



#### Communication port number and interrupt level

The user must dedicate a port from COM1 to COM4 to the board.

By default, in a T PCX CCX 77 3 system, communication port 1 is designated COM2 with IRQ3 (COM1 is designated for use by the mouse).

Note:

Simultaneous use of COM1 and COM3 or COM2 and COM4 is not allowed (possible interrupt loss controlled on an edge by the BIOS), simultaneous configuration remains possible.

#### Controlling INIT/PWF signals from the power supply

- For T PCX CCX 77 3 systems: the cable from the T PCX CCX 77 3 system power supply is connected to the INI/PWF/+12V pin set corresponding to enabling the use of INIT/PWF signals in the event of a power break/return.
- For T PCX 87 455 systems: the jumpers are set to INI and +12V corresponding to disabling the use of INIT/PWF signals in the event of a power break return.

#### W1 DIP-switches

Save the application using the battery back-up.



Backed-up



Not backed-up

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## 3.2 Software Configuration

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### 3.2-1 X-TEL and PL7-3 Software in the CCX 77 FR Controller

- Installing the terminal port driver in the CCX 77 FR
  - X-TEL installed in the CCX 77 FR: the X-TEL software workshop software includes the terminal port driver, making it unnecessary to install it specially.
  - X-TEL not installed in the CCX 77 FR: the terminal port driver must be installed.

**Note:**

In the OS/2 CONFIG.SYS file, the following line is automatically added by X-TEL:  
`DEVICE=C:\XPROSYS\EXE\DTSX_PC01.SYS MAXSPEED=19200 COM=COM2`

- Disabling the second serial link.

**Important:**

As the PL7-3 coprocessor uses the COM2 port, it is necessary to disable the second serial link on the CCX 77 FR or PC compatible processor board as this often uses the COM2 port.

To do this on a CCX 77 FR system:

- Restart the system by pressing the <CTRL>/<ALT>/<DEL> keys,
- Press function key <F2> while the system is restarting (this displays the CCX system configuration screens),
- Select "Communication Ports" then press <Enter>>,
- Select "RS485/CL20 (PLC) COM2" then press <Enter>>,
- Select "Invalidate" then press <Enter>>,
- Press the <Esc> (Escape) key twice,
- The following message is displayed:  
`"Confirm modifications Y/N:"`  
Select Yes,
- Restart the system by pressing the <CTRL><ALT><DEL> keys to take into account the modifications made.

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### 3.2-2 Monitor 77/2 Software (for OS/2) in a CCX 77 FR Controller

- Install the OS/2 screen driver  
`DEVICE=C:\ Path \DTSXPC01.SYS MAXSPEED=19200 COM=COM2`
- Basic parameters for the M77/2 supervision application:
  - Configure the communication task for the terminal link,
  - Define the logical port and its transmission characteristics,
  - Define the logical station(s) connected to this logical port.



- Example of an application developed under Monitor 77/2 V43 for a T PCX CCX 77 3• integrated system.

- Configure the communication task.

System Configuration Information			
Flags	Task Name	.....	Program Arguments
FR	TETSXPC		8

- Define the logical port

External Device Definition					
Logical port	Physical card	Physical port	Device name	Function	Memory
0	0	0	TE__	CUSTOM	16

- Define the transmission characteristics

Telemecanique Logical Station Information								
Logical port	Baud Rate	Parity	Data bits	Stop bits	Type	First Slave addr.	Last Slave addr.	Status MSG Tag Name
0	19200	ODD	18	1	TEPCS	1 (*)	2 (*)	

(\*) 1 and 2 define the use of terminal ports 1 and 2 (3 being for X-TEL).

- Write the tables of communication variables

Telemecanique Logical Station Information							
---	Station program	XTEL station name	Device type	Network Number	Station Number	Gate Number	Module Number address
	0	St_PCX	PMX V5	0	FE	0	0
Logical port = 0							

Device Number address	Response Time out second	TW7	DROP
0	10	NO	0

The above tables are the only difference between a Monitor 77/2 application that uses a PL7-3 coprocessor and a standard Monitor 77/2 application. (Refer to the Monitor 77/2 System User's Manual to continue with application development).

### 3.2-3 Monitor 77 Software in a CCX 77 FR Controller

- Install the TSX LF TP V52 terminal link driver (Dos and Windows)  
 DEVICE=C:\path\DRIVERS\DTSXPC.EXE PROFILE=C:\path\DRIVERS\DTSXPC.001
- Setting the base parameters for the Monitor 37 operator dialog application
  - Configure the operator dialog communication via the PCX7 terminal link by selecting type CCX/PC with PCX7 from the Application Selection window.
- Rules for use
  - Configure the MMI PL7 OFB instead of the MMI OFB in the PL7-3 application
  - The TENFT task will never be active
  - New versions of the optional diagnostics tasks will be available for the PCX7 range : the minimum versions are : DIAG (version 3.7), VISUDYN (version 3.9), and ADJUST (version 3.7).  
 These options are also included in two software packs : MMI37PK V6.02 and M37DGPak V6.02
  - The DIAGFAS optional task should not be installed.
  - Certain mouse drivers are incompatible with the Monitor 37 : PCX7 combination.

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### 3.2-4 Monitor 77 Software (for DOS) in a CCX 77 FR Controller

Two operations need to be performed:

- Installing the necessary software: Quarterdeck Corp. DESQview, Monitor 77/DOS and the Telemecanique Terminal port driver for DOS (TSX LF TP V52),
- Setting the basic parameters of the supervision application to be developed in Monitor 77.

#### Installing the necessary software

- Install DESQview and Monitor 77 according to the procedure described in the Monitor 77 System User's Manual (TSX DM M77•), Chapter B2,
- Install the terminal port driver from the TSX LF TP V52 diskette following the procedure described below:
  - Identify the number of the COM port configured on the PL7-3 coprocessor board: COM1, COM2, COM3 or COM4,
  - Insert the TSX LF TP V52 diskette in drive A:
  - Type the command "**a:INSTM77**" and follow the instructions displayed on-screen,
  - The COM port proposed by default is COM2. If necessary change it to match the COM port configured on the PL7-3 coprocessor port,
  - Once the INSTM77 program is closed, restart the system by pressing the <CTRL><ALT><DEL> keys. The system is then ready for Monitor 77 application development.

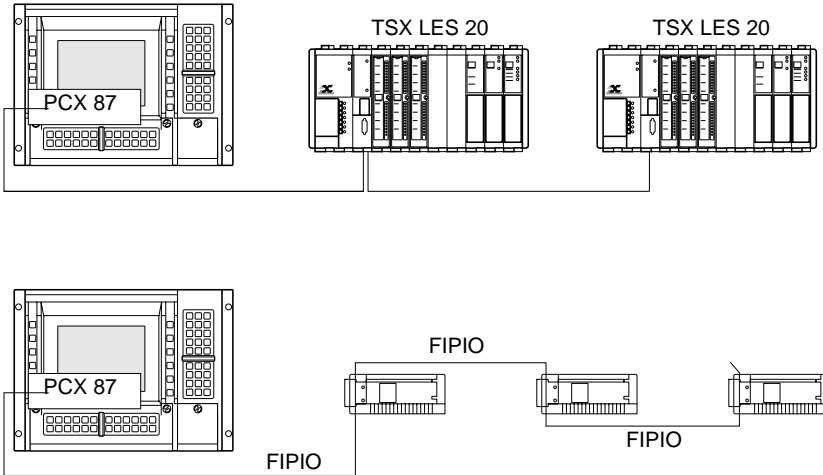
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## Setting the basic parameters of the Monitor 77 application

So that a Monitor 77 application can communicate with the PL7-3 coprocessor user program, a terminal link type logical port must first be defined ("PCONS1" key word), using the Monitor 77 CONFIGURATION MANAGER program.

This is the only difference between a Monitor 77 application for a PL7-3 coprocessor and a standard Monitor 77 application. Refer to the Monitor 77 System User's Manual (TSX DM 77•) to continue with application development.

Example:



"PCONS1" type logical port 0 with a single logical station 0 type "87-4xx" at address NET.STA = 0.254

Important:

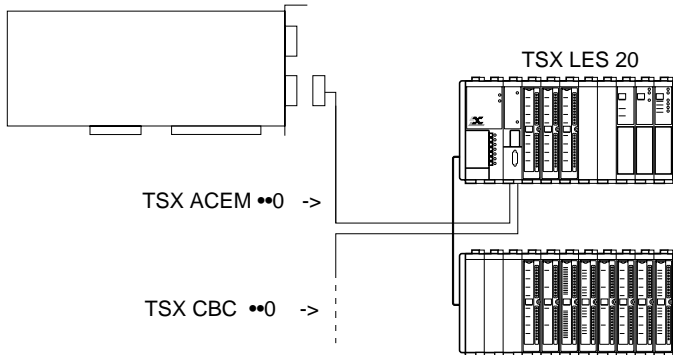
After a mains power break affecting the CCX 77 FR, selecting RUN to start the Monitor 77 application can cause prolonged display of the message "attach socket in progress... Allocated socket = 1" (sometimes this lasts as long as one minute): This is a normal system reaction and corresponds to the time required to increase the speed of the terminal port protocol.

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### 3.3 Connections

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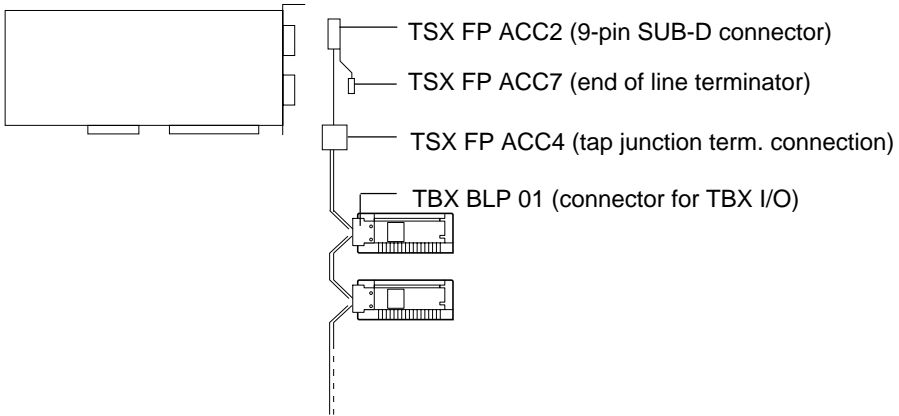
#### 3.3-1 PL7-3 Coprocessor, T PCX 87 455 Link with In Rack Local I/O



The connection between the PL7-3 coprocessor and the first TSX LES 20 local extension is performed via a TSX ACEM xyz cable, with:

- xyz = 030 for a 3 meter long cable
- 100 for a 10 meter long cable
- 200 for a 20 meter long cable
- 300 for a 30 meter long cable

### 3.3-2 PL7-3 Coprocessor, T PCX 87 455 Link to the FIPIO Bus/FIPWAY Network



### 3.3-3 Additional Precautions

When no FIP segment is connected to the PL7-3 processor, it is essential to:

- Fit a TSX FP ACC2 connector with two TSX FP ACC7 end of line terminators to ensure network end of line adaptation, or
- To code the network/station addresses with values that exceed limits. Not meeting these restrictions will give the PL7-3 coprocessor an incorrect image of the FIP segment (reducing the quality of application section processing).

