7188 Series

Hardware Manual



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1. Introduction

The 7188 is a embedded controller designed for industry applications. It can be used to replace the PC or PLC for the harsh environment. The 7000 series is a family of network data acquisition and control modules. They provide A/D, D/A, DI/O, Timer/Counter and other functions. These modules can be remote controlled by a set of commands.

Order Item	Common Features	5-digit LED	O. S.
7188	The hardware is the	No	BASIC7
7188D	same except the 5-	Yes	BASIC7
7188/DOS	digit LED & the	No	ROM-DOS
7188D/DOS	software inside.	Yes	ROM-DOS

The 7188 can be ordered as following:

What is DOS?

DOS is an acronym for Disk Operating System. Several brands of DOS' have been created by various companies. In all cases, DOS--whether PC-DOS, MS-DOS, or ROM-DOS--is a set of commands or code which tells the computer how to process information.

DOS runs programs, manages files, controls information processing, directs input and output, and performs many other related functions.

What is ROM-DOS?

ROM-DOS is an operating system which can be embedded in ROM (Read Only Memory) and can run entirely from within ROM. ROM-DOS is functionally equivalent to other brands of DOS, and can run programs that are executable under a standard DOS (which executes out of RAM). With ROM-DOS, the executable program may reside in RAM or may be placed in ROM along with ROM-DOS. **The 7188D/DOS & 7188/DOS are equipped with Datalight's ROM-DOS.**

What is BASIC7?

BASIC7 is an extend BASIC interpreter for 7188 series. It is very similar to PC's QBASIC. The 7188D & 7188 are equipped with BASIC7 interpreter.

More Information

Refer to . 7000 Bus Converter User Manual. chapter 1 for more information as following:

1.1 7000 Overview

- **1.2 7000 RELATED DOCUMENTATION**
- **1.3 7000 COMMON FEATURES**
- **1.4 7000 System Network Configuration**
- 1.5 7000 Dimension

Package List

In addition to this manual, the package includes the following items:

- One 7188 hardware module
- One software utility disks
- One software user manual
- One download cable,CA0910

Accessory Order Information

- CA0910: Download cable, 3-terminal to DB-9, for COM3, COM4 of 7188
- CA0915: female DB-9 to male DB-9, for COM1 of 7188

Note

If any of these items are missing or damaged, contact the local distributors for more information. Save the shipping materials and cartons in case you want to ship in the feature.

1.1 Features

- AMD's embedded CPU, 80188, 40M Hz
- 256K SRAM & 256K Flash ROM
- Flash ROM can be 512K (special order, call for details)
- Built-in RTC & NVSRAM & EEPROM
- Built-in 4 channels of COM port
- COM driver support interrupt & 1K QUEUE buffer
- Built-in watchdog timer for harsh environment
- Built-in power protection circuit
- Built-in RS-485 network protection circuit
- Program download from PC
- Built-in Datalight's ROM-DOS & ROM-DISK (7188/DOS or 7188D/DOS)
- Year 2000-Compliance
- RTC leap year compensation from 1980 to 2079
- BIOS support RTC time & date
- ROM-DOS support RTC time & date
- BASIC7 support RTC time & date
- Built-in BASIC7 interpreter (7188 or 7188D)
- Built-in 5-digit LED display (7188D/DOS or 7188D)

WARNING 1: The COM2 is not isolated to CPU. If there is large noise in the RS-485 network, the 7188 may be damaged. It is recommended to add one 7510 between the COM2 & external RS-485 network. Refer to Sec. 1.6.4 for more information.

WARNING 2: The COM1 can be used as RS-485 port. If the COM1 is used as RS-485, it is recommended to add one 7510 between the COM1 & external RS-485 network. Refer to Sec. 1.6.4 for more information.



WARNING: The COM2 is not isolated to CPU. If there is large noise in the RS-485 network, the 7188 may be damaged. It is recommended to add one 7510 between the COM2 & external RS-485 network. Refer to Sec. 1.6.4 & Sec. 1.1 for more information.

Pin assignment of 10-pin screw terminal:

	<u> </u>	
Pin	Name	Description
1	RXD4	RXD pin of COM4 (RS-232)
2	TXD4	TXD pin of COM4 (RS-232)
3	GND	GND pin of COM3 & COM4
4	TXD3	TXD pin of COM3 (RS-232)
5	RXD3	RXD pin of COM3 (RS-232)
6	INIT*	Initial pin for program download
7	D2+	DATA+ pin of COM2 (RS-485)
8	D2-	DATA- pin of COM2 (RS_485)
9	+VS	V+ of power supply (+10V to +30V unregulated)
10	GND	GND of power supply

Note 1: COM2=(D2+, D2-)

Note 2: COM3=(TXD3, RXD3, GND)

Note 3: COM4=(TXD4, RXD4, GND)

Note 4: COM3&COM4 share the same GND-pin

Pin assignment of COM1 connector (DB-9):

Pin	Name	Description
1	DCD	Data Carrier Detect
2	RXD	Receive Data(JP1 select RS-232)
	D+	DATA+ of RS-485 (JP1 select RS-485)
3	TXD	Transmit Data (JP1 select RS-232)
	D-	DATA- of RS-485 (JP1 select RS-485)
4	DTR	Data Terminal Ready
5	GND	Signal ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

Note 5: The COM1 can be used as RS-232 or RS-485 port selected by JP1. Refer to Sec. 1.5 for JP1 setting.

- Note 6: The connector of COM1 is the same as the DB-9 RS-232 connector of PC. (JP1 select RS-232)
- Note 7: The COM1 can direct drive 7000 modules if JP1 is set in the RS-485. Refer to Sec. 1.6.5 for wire connection.

1.3 Specifications

System

- CPU: AMD 80188, 40M Hz
- SRAM: 256K
- FLASH ROM: 256K (can be 512K, call for detail)
- User ROM-DISK: 192K
- User EXE program in ROM-DISK: nearly 192K max.
- OS: Datalight's . ROM DOS. or BASIC7 interpreter
- COM: COM1, COM2, COM3, COM4
- Built-in Watch Dog Timer
- Built-in power protection & network protection circuit
- Program download from PC
- EEPROM support
- RTC & NVSRAM support

Real Time Clock

- Year-2000 compliance
- seconds, minutes, hours, date of the month
- month, day of week, year, valid up form 1980 to 2079
- NVSRAM: 31 bytes, data valid up to 10 years
- Lithium battery for RTC & NVSRAM

EEPROM

- 1024 bytes
- Data retention > 100 years
- 1,000,000 erase/write cycle

Datalight's . ROM DOS. for 7188/DOS & 7188D/DOS

- Fully MS DOS 6.x compatible
- RAM-DISK & FLASH ROM-DISK support
- Program edit, download from PC

BASIC7 Interpreter for 7188 & 7188D

- Program edit, download from PC
- Extend QBASIC to support all 7188 features

COM1

- RS-232 or RS-485 jumper select
- RS-232: TXD,RXD,RTS,CTS,DTR,DSR,DCD,RI,GND
- RS-485: D1+, D1+
- Communication speed: 115.2K max.
- 16 bytes FIFO
- Interrupt or polling

COM2

- RS-485: D2+, D2-
- Communication speed: 115.2K max.
- 16 bytes FIFO
- direct connect to 7000 RS-485 network
- Interrupt or polling

COM3

- RS-232: TXD3, RXD3, GND
- Communication speed: 115.2K max.
- Interrupt or polling

COM4

- RS-232: TXD4, RXD4, GND
- Communication speed: 115.2K max.
- Program download at 57600 BPS
- Can be used as general purpose RS-232 after download
- Interrupt or polling

Display

• 7-seg LED: 5-digit (for 7188D & 7188D/DOS)

Power

- Power requirements: +10V to 30V(non-regulated)
- Power consumption: 2W for 7188 & 7188/DOS

2.2W for 7188D & 7188D/DOS

1.4 Block Diagram of 7188



1.5 Jumper Setting

The JP1 setting is given as following:



1.6 **Application Wiring**

1.6.1 **Connect COM4 to PC**

Note:

(for Program Download from PC to 7188)



• Connect the DB-9 of download cable to PC COM-1/2/3/4 port

1.6.2 Connect COM3 to 3-wire RS-232 Device



Note:

- There are 3 wires in the download cable
- Connect the wire-1, label RX, to pin-5 of 7188
- Connect the wire-2, label TX, to pin-4 of 7188
- Connect the wire-3, label GND, to pin-3 of 7188
- Connect the DB-9 of download cable to RS-232 COM port

1.6.3 Connect COM2 to 2-wire RS-485 Device



Note:

- The 7188 can directly drive 256 sets of 7000 modules without repeater
- The 7188 can connect to 7000-repeater, 7510, for long distance applications.
- The 7188 can drive any 2-wire RS-485 network

1.6.4 Connect COM2 to 7510 for Isolation



- The 7188 can direct drive 256 set of 7000-modules without repeater
- The 7188 can drive any 2-wire RS-485 network

WARNING: The COM2 is not isolated to CPU. If there is large noise in the RS-485 network, the 7188 may be damaged. It is recommended to add one 7510 between the COM2 & external RS-485 network. Refer to Sec. 1.1 for more information.

1.6.5 Connect COM1 to 9-wire Modem



Note:

• The COM1 pin assignment of 7188 is the same as PC.

1.6.6 Connect COM1 to two-wire RS-485 Device



Note:

- The 7188 can directly drrive 256 set of 7000-modules without repeater
- The 7188 can connect to 7000-repeater, 7510, for safety & long distance applications. (Refer to Sec. 1.1 for more information)
- The 7188 can drive any 2-wire RS-485 network

1.7 Comparison Table

	I-7188D/DOS	ADAM 4500
Module name	Embedded	PC-Based
	Controller	Communication
		Controller
CPU	AMD 80188, 40M	AMD 80188, 40M
RAM	256K	256K
Flash ROM	256K (can be 512K)	256K
User ROM-DISK	192K	171K
User EXE program	192K-0K=192K	171K-44K=127K
in ROM-DISK	(system=nearly 0K)	(system=44K)
ROM DOS	Yes	Yes
RTC	Yes	Yes
Program Download	Yes	Yes
Watch Dog CKT	Yes	Yes
COM port	4 (interrupt driven,	2 (another one for
-	1K QUEUE buffer	program download)
	for every channel)	
EEPROM	1024 bytes	No
7-Seg LED	5-digit	No

	I-7188D	ADAM 4521
Module Name	Embedded	Addressable
	Controller	RS-232/485 to RS-
		232 Converter
Program Download	Yes	No
Number of RS-232	3	1
device can handle		
Build-in program	No (with demo	Yes
	program to connect	
	3-RS-232 device at	
	the same time)	
Function	flexible	limit
	(programmable)	(non-programmable)

2. Operation Principle

2.1 System Mapping

Device	Address mapping
Flash ROM	From C000:0000 to F000:FFFF
SRAM	From 0000:0000 to 3000:FFFF
COM1 BASE	0x200
COM2 BASE	0x100
COM3	FF80 to FF88
COM4	FF10 to FF18
I/O port	FF70 to FF7A

Interrupt No.	Interrupt mapping
0	Divided by zero
1	Trace
2	NMI
3	Break point
4	Detected overflow exception
5	Array bounds exception
6	Unused opcode exception
7	ESC opcode exception
8	Timer 0
9	Reserved
0A	DMA-0
0B	DMA-1
0C	COM 1
0D	COM 2
0E-10	Reserved
11	COM 4
12	Timer 1
13	Timer 2
14	COM 3
15 – 1F	Reserved

Four independent COM port:

Port	Description
COM1	 For general purpose 9-wire RS-232 application
	 For general purpose 3-wire RS-232 application
	 For general purpose 2-wire RS-485 application
	 For remote control application (by Modem)
	 16C550 compatible
COM2	 Direct control 7000 series modules
	 For general purpose 2-wire RS-485 application
	 16C550 compatible
COM3	 For general purpose 3-wire RS-232 application
	 UART of AMD-80188 compatible
COM4	 For program download
	 For program debug
	 For general purpose 3-wire RS-232 application
	 UART of AMD-80188 compatible

WARNING 1: The COM2 is not isolated to CPU. If there is large noise in the RS-485 network, the 7188 may be damaged. It is recommended to add one 7510 between the COM2 & external RS-485 network. Refer to Sec. 1.6.4 for more information.

WARNING 2: The COM1 can be used as RS-485 port. If the COM1 is used as RS-485, it is recommended to add one 7510 between the COM1 & external RS-485 network. Refer to Sec. 1.6.4 for more information.

NOTE:

- The 7510 can be used to isolated the 7188 from the noisy RS-485 network.
- The 7510 can be used to extend the RS-485 network distance to more than 1.2Km.
- The 7510 can be used to extend the 7000 modules to more than 256 modules.

2.2 Use COM4 to Debug Program

The COM4 of 7188 has three major functions. The first function is to download program from PC. The second function is to link PC for program debug. The last function is to be used as a general purpose COM port.

When the 7188/DOS or 7188D/DOS first power on, it will initialize the COM4 to the following configuration:

• Start-bit=1, data-bit=8, stop-bit=1, no parity

• Baud rate = 57600

Then the 7188/DOS or 7188D/DOS will send all power-on information to COM4. The user can see all power-on message as following:

- Power-off PC & 7188D/DOS or 7188/DOS
- Install the download cable between 7188's COM4 & PC's COM1 (refer to Sec. 1.6.1)
- Power-on PC & Run 7188.EXE
- Power-on 7188D/DOS or 7188/DOS
- All power-on message will be shown in monitor of PC After the power-on stage, the 7188 will use the COM4

as its standard input/output. So the standard output of 7188 will be shown in PC's monitor. If the user press any key in PC's keyboard, this key will be sent to 7188 as standard input. Therefore the keyboard & monitor of PC can be used as standard input & output of 7188 as following:

- Use 7188.EXE as a bridge between 7188 & PC
- Run 7188.EXE in PC to setup this bridge
- Keyboard of PC \rightarrow standard input of 7188
- Monitor of PC \rightarrow standard output of 7188

In this way, the 7188D/DOS or 7188/DOS can read some data from keyboard & show some information in monitor. So the program debug will become more easy & effective.

Note: 7188.EXE is given in the companion floppy disk of 7188D/DOS or 7188/DOS.

2.3 Use COM4 to Download Program

The 7188 use COM4 to download program from PC. The steps for 7188D/DOS & 7188/DOS to download program are given as following:

- Power off the 7188
- Connect the INIT*-pin to GND*-pin (refer to Sec. 1.6.1)
- Install the download cable between 7188's COM4 & PC's COM1.
- Power on PC & run 7188.EXE
- Power on the 7188
- The 7188 detect that INIT*-pin is short to GND-pin → handshake to download program 7188.EXE (in PC)
- The 7188 will automatically download ROM_DISK.IMG from PC to the flash ROM-DISK of 7188.
- If the download is OK, power off the 7188.
- Disconnect the INIT*-pin & GND-pin of 7188.
- Power on the 7188.
- The 7188 will execute new ROM-DISK program now.

When the 7188 first power-on, it will detect the status of INIT*-pin. If the INIT*-pin is short to GND-pin, the 7188 will download program from PC.

If the user short the INIT*-pin to GND-pin after first power-on, the 7188 will not take any action. The status of INIT*-pin will be don't care after the first power-on stage.

The download configuration of COM4 is given as following:

- Start-bit=1, data-bit=8, stop-bit=1, no parity
- Baud rate = 57600

Note: 7188.EXE is given in the companion floppy disk.

2.4 Use COM4 As a COM Port

The user can use COM4 as a general purpose RS-232 port as following:

- Download ROM_DISK program from PC first.
- Power off 7188 & remove the download cable from PC.
- Disconnect the INIT*-pin & GND-pin of 7188.
- Power on 7188 (no standard input, no standard output, no debug information)
- Install the download cable between new RS-232 device & 7188's COM4
- Initialize the COM4 to new configuration.
- The COM4 is a general purpose RS-232 port now.
- Refer to "7188 ROM-DOS Software User Manual" for demo program

2.5 Use COM3 for RS-232 Applications

The COM3 is a 3-wire RS-232 port. It includes 3 pins as following:

- GND: signal ground, shared with COM4
- TXD3: transmit data to external RS-232 device
- RXD3: receive data from external RS-232 device
- Refer to Sec. 1.6.2 for wire connection
- Refer to "7188 ROM-DOS Software User Manual" for demo program.

2.6 Use COM2 for RS-485 Applications

The COM2 is a 2-wire RS-485 port. It includes 2 pins as following:

- D2+: connect to DATA+ of RS-485 network
- D2-: connect to DATA- of RS-485 network

The COM2 is designed to directly drive 7000 series modules. It is a half-duplex 2-wire RS-485 network. The direction control in 2-wire RS-485 network is very important. It is recommended to control the direction of COM2 as following:

- Initiate the direction of COM2 to RECEIVE state
- Keep the RECEIVE state until 7188 has to transmit command
- If 7188 has to transmit command
 - \rightarrow set the direction of COM2 to TRANSMIT state
 - \rightarrow transmit the command string out
 - → wait until all command chars are transmitted over to the RS-485 network (not to the FIFO, refer to software manual for more information)
 - \rightarrow set the direction of COM2 to RECEIVE state
 - ightarrow receive the response string
 - \rightarrow keep in the RECEIVE state until next transmit

The working steps for 7000 related applications are given as following:

- 1. 7188 send command string to 7000 modules
- 2. Destination 7000 module execute this command
- 3. Destination 7000 module **delay 1 byte for settling time**
- 4. Destination 7000 module echo back the result string to 7188

The delay time in step 3 is only 1 byte, the 7188 has to change the direction from TRANSMIT to RECEIVE before the delay time is up.

NOTE: the COM2 can not be used in the full-duplex 4-wire RS-485 application.

2.7 Use COM1 for RS-232 Applications

The features of COM1 are given as following:

- Pin assignment is compatible to RS-232 DB-9 connector of PC.
- Programming is 16C550 compatible
- I/O base address is different from PC's COM1
- Interrupt handling sequence is different from PC
- Can be used as 9-wire RS-232 signal
- Can be used as 3-wire RS-232 signal
- Can be used as 2-wire RS-485 signal
- RS-232/RS-485 is selected by JP1
- Refer to Sec. 1.6.4 for wire connection & jumper setting

The I/O base address & the interrupt handling sequence is different from PC. Therefore the user can not download the PC's RS-232 application program into 7188.

2.8 Use COM1 for RS-485 Applications

The COM1 can be used as a 2-wire RS-485 port. It includes 2 pins as following:

- RXD/D2+: connect to DATA+ of RS-485 network
- TXD/D2-: connect to DATA- of RS-485 network The COM1 is very similar to COM2 in RS-485 applications. Refer to Sec. 2.7 for more information.

2.9 COM Comparison: 7188 & PC

The COM ports of 7188 are given as following:

COM port	Hardware
COM1	16C550
COM2	16C550
COM3	80188's on-chip UART-0
COM4	80188's on-chip UART-1

The programming of 16C550 is very different to 80188's UART. The interrupt handling of 80188 is also very different to PC's 8259. Therefore the user can not download the PC's RS-232 application program into 7188.

The software driver of 7188 is a interrupt driven library which provide 1K QUEUE buffer for every COM port. The software is well-designed & easy to use.

The software driver provide the same interface for all these 4 COM ports. The user can use these COM port in the same way without any difficulty.

2.10 Use LED & 7-SEG LED Display

The red-LED of 7188 can be turned-ON or turned-OFF by software program. The 5 digits of seven-segment LED are also programmable. **The 5-digit LED is very useful in real world applications.** It can be used to replace the monitor & touch-screen in many applications.

7188 & 7188/DOS	Red-LED
7188D & 7188D/DOS	Red-LED & 5-digit LED

2.11 Use RTC & NVSRAM

The RTC & NVSRAM are located in the same chip. There is a Li-battery to backup the RTC & NVSRAM for 10 yeas. The features of RTC are given as following:

- Year 2000 Compliance
- BIOS support RTC time & date
- ROM-DOS support RTC time & date
- BASIC7 support RTC time & date
- seconds, minutes, hours, date of the month
- month, day of week, year, Leap year valid up to 2100
- NVSRAM: 31 bytes

The user can use DOS command or BIOS call to read/write RTC.

The NVSRAM can be read/write any number of times. The features of NVSRAM are given as following:

- Data Valid : 10 years
- Read/write cycles: without limit
- Total 31 bytes

2.12 Use EEPROM

The EEPROM is designed to store the data which are not changed very frequently. These data are given as following:

- module ID, configuration setting
- COM port configuration setting
- Small data base

The erase/write cycle of EEPROM is limited, the user should not change the EEPROM frequently for testing. The EEPROM can be erase/write in single byte, so it is very useful in real world applications.

2.13 Use Watchdog Timer

The watchdog timer of 7188 is fixed at 1.6 sec. When the 7188 is power on, this watchdog will be always enable. If the 7188 does not refresh this watchdog for 1.6 second, the watchdog will RESET the 7188.

The ROM-DOS of 7188D/DOS & 7188/DOS will automatically fresh the watchdog after first power on. The user program can call the software driver to tell ROM-DOS stop refresh, then this user program will refresh the watchdog. If the user program does not refresh this watchdog for 1.6 second, the watchdog will RESET the 7188.

The user program can tell the ROM_DOS to refresh watchdog again, then the user program can stop & return to the ROM-DOS. Refer to "7188 ROM-DOS Software User Manual" for demo program

The BASIC7 will handle the watchdog in the same way as the ROM-DOS.

3. Applications

3.1 Embedded Controller



Applications:

- ADAM-4500 replacement & enhancement (not compatible)
- PC-Based controller replacement
- PLC replacement
- Special controller replacement

The 7188 can be use as embedded controller for general application. Therefore it can be used to replace PC, PLC or special controller.

1	
Programming	• TC & MSC for 7188/DOS & 7188D/DOS
Tool	• BASIC7 for 7188 & 7188D
Debug Tool	• Program via standard input or standard output
	(keyboard & monitor of PC)
Man	• MMICON
Machine	• Keyboard & monitor of PC
Interface	• Touch Screen (RS-232 or RS-485 interface)
program	Stored in Flash ROM-DISK
Input/Output	• 7000 series modules
	• can direct control 256 modules = thousands of
	I/O points

3.2 Addressable RS-232 Protocol

Converter



Applications:

- ADAM-4521 replacement & enhancement
- Multiple RS-232 devices networking

The key points are given as following:

- Connect RS-232 devices to COM1, COM3, COM4 of 7188
- Connect COM2 of 7188 to RS-485 network
- Store the 7188 module address into EEPROM(inside of 7188)
- 7188 communicate to its local RS-232 devices & store data Host PC communicate to every 7188 for reading data from

Host PC communicate to every 7188 for reading data from these RS-232 devices Refer to "7188 ROM-DOS Software Manual" for demo program.

3.3 Local Real Time Controller



The 7000 series modules are slave devices, the control program are implemented in host PC. The working steps are given as following:

- 1. PC send out command to 7000 modules for input data.
- 2. PC analyze these input data & generate some output data
- 3. PC send out command to 7000 modules for output data

If there are hundred of 7000 modules, the PC will take a long time to analyze & control these modules.

The control program can be implemented in local 7188. The PC only has to send control arguments to 7188, the 7188 will control the local 7000 modules based on these control arguments. In this way, the PC can handle thousands of 7000 modules with 7188.

Some control functions are **timing critical**. The local 7188 can real time handle these functions without PC. Refer to "7188 ROM-DOS Software Manual" for demo program.



The control program is implemented in local 7188. The 7188 will direct control the 7000 modules based on these control arguments.

The PC can access the remote 7188 for the following items:

- query & record the remote system status
- download the control arguments to remote 7188

The remote 7188 can communicate to PC for the following items:

- emergency events call back
- remote system status send back

Refer to "7188 ROM-DOS Software Manual" for demo program.

3.5 I/O Extension of PLC applications



There is a Man Machine Interface in most PLC. This interface is originally designed for MMI application. The 7188 can use this interface to build a bridge between PLC & 7000 modules.

The 7188 can direct read/write the internal memory of PLC. Therefore the **PLC can access the 7000 input modules** as following:

- 1. 7188 send command to 7000 input modules
- 2. 7188 write these data to PLC's internal memory
- 3. PLC access these data from internal memory

The PLC can control the 7000 output modules as following:

- 1. PLC write data to its internal memory
- 2. 7188 read these output data from PLC's memory
- 3. 7188 send command to 7000 output modules

In this way, the input data of 7000 modules can be shown in touch screen. Also, the user can control the output of 7000 modules in touch screen. Refer to "7188 ROM-DOS Software Manual" for demo program.



3.6 Radio Modem Applications

These devices can be PLC.

controller or 7000 modules.

3.7 Use all 4 COM port Application-1



Refer to "7188 ROM-DOS Software Manual" for demo program.



COM1: link to remote host PC

COM2: direct control 7000 input/output modules

COM3: TOUCH7 is used as the local MMI

COM4: Card reader is used as standard input device.

Refer to "7188 ROM-DOS Software Manual" for demo program.

4. Learning Kits

4.1 IKIT-07/110 & IKIT-07/220



Package list:

- 7188D/DOS * 1, 7060 * 1, download cable CA0910 * 1
- PWR-24/110 * 1 or PWR-24/220 * 1
- "7188 Hardware manual" * 1
- "7188 ROM-DOS software manual" * 1
- 7188 ROM-DOS software utility disk * 1

Features:

- All wire connections are ready for use.
- DEMO50.EXE will be executed automatically after first power on.
- The PC can directly control the D/O of the 7060
- All D/I of the 7060 will be shown in the PC's monitor
- All debug information will be shown in the PC's monitor
- Refer to \NAPDOS\MSC\DEMO50\README.DOC for more information.

4.2 IKIT-08/110 & IKIT-08/220



Package list:

- 7188D/DOS * 1, 7060 * 1, download cable CA0910 * 1
- PWR-24/110 * 2 or PWR-24/220 * 2
- TOUCH7*1, user manual*1, utility disk*2, cable CA0910B * 1
- "7188 Hardware manual" * 1
- "7188 ROM-DOS software manual" * 1
- 7188 ROM-DOS software utility disk * 1

Features:

- All wire connections are ready for use.
- DEMO51.EXE will be executed automatically after first power on.
- The TOUCH7 & PC can directly control the D/O of the 7060
- All D/I of the 7060 will be shown in the TOUCH7 & PC's monitor
- All debug information will be shown in the PC's monitor
- Refer to \NAPDOS\MSC\DEMO51\README.DOC for more information.

4.3 IKIT-09/110 & IKIT-09/220



Package list:

- 7188D/DOS * 1, 7060 * 2, download cable CA0910 * 1
- SST-900 * 2, PWR-24/110 * 3 or PWR-24/220 * 3
- TOUCH7*1, user manual*1, utility disk*2, cable CA0910B * 1
- "7188 Hardware manual" * 1
- "7188 ROM-DOS software manual" * 1
- 7188 ROM-DOS software utility disk * 1 Features:
- All wire connections are ready for use.
- Demo52.exe will be executed automatically after first power on.
- The TOUCH7 & PC can directly control the D/O of these two 7060. All D/I of these two 7060 will be shown in the TOUCH7 & PC's monitor
- All debug information will be shown in the PC's monitor
- Refer to \NAPDOS\MSC\DEMO52\README.DOC for more information.

Appendix: Specifications of TOUCH7

Input power	24VDC +/- 5%
CE	complies with EN50081-2 and EN50082-2
	standards
EMI	complies with FCC Class A
Isolation resistance	Exceed 50MW at 500VDC
Vibration endurance	10 to 25 Hz(X,Y,Z direction 2G 30minutes)
Protection structure	IP65 front panel(O ring seal)
Operating Temperature	0~45C
Operation humidity	10-90% RH
Dimensions HxWxD	204x150x75mm
Weight	Approx. 1.0kg
Hardware Specification	
Display	5.7" high contrast, blue mode LCD
Resolution	320(W) x 240(H) dots
Display area	120(W) x 90(H) mm
Dot size	0.33(W) x 0.33 (H) mm
Back light	CCFT (MTBF 10,000hr, w/ auto shutdown,
	replaceable)
Touch panel	resistive type, audible feedback on touch
Touch resolution(grid)	40(W) x 30(H)
Surface hardness	4H
Serial port	RS-232 x1 RS-485 x1 (2/4 wires auto
	setup)
Memory	512K bytes flash ROM
System diagnostic	power failure detection
Functional Specification	
Screen edit	by EasyBuilder screen editor (running under
	Windows)
No. of screen	256
No. of object	5370
Text string	1792 (max. capacity 52k bytes)
Bitmap graphics	288K bytes
NOTE:	

- The TOUCH7 is a special OEM version of EasyView.
- EasyBuilder is a screen editor provided by EasyView.