

Printek ICX Interface

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by

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Printek Part Number 3169

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INTRODUCTION

The Printek ICX Interface Option for the FormsPro 4300, FormsPro 4500, and FormsPro 4503 printers provides a coaxial interface for IBM Mainframe Host Systems, as well as an industry standard parallel interface and an RS-232C interface.

IBM Coax Interface

When connected via coax to the Mainframe (3270) environment the printer responds to the system as an IBM4224 IPDS capable printer. The IPDS interface can be used with a large variety of IBM software, including GDDM, Office, Mapics, AFPU as well as third part software. This interface supports many features of the software packages, including:

Bar Codes	Variable Text
Images	Logos
Graphs and Charts	

The coax interface is also capable of being used concurrently with the parallel interface. When the printer is printing a job received at the parallel interface, a printer busy signal is sent to the coax interface.

Parallel Interface

The parallel interface may use any of the FormsPro 4000 series printer emulation modes.

The parallel interface is capable of being used concurrently with the coax interface. When the printer is printing a job received at the coax interface, a printer busy condition is indicated at the parallel interface.

RS-232C Serial Interface

The RS-232 serial interface may use any of the FormsPro 4000 series printer emulation modes.

The serial interface does not operate concurrently with either the coax or the parallel interface.

Installation

Coax IPDS Interface

This section details the installation of the FormsPro 4000 Series printer into the 3270 mainframe environment. It is divided into two sections, Physical Installation and System Installation.

Physical Installation

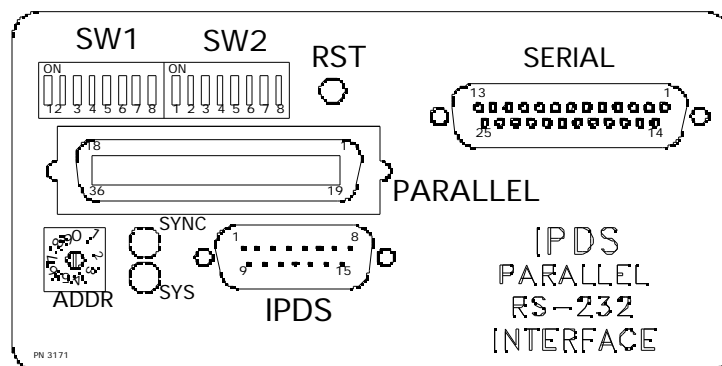
Attach the supplied BNC adapter to the connector labeled IPDS on the rear panel of the printer. See Figure 1.

Connect the coax cable from the cluster controller (3174, 3274 or 3276 controller) to the BNC adapter.

Set the configuration switches as required by your system. See Figure 2 for the switch assignments.

Power on the printer. Request the user to send the printer a screen dump. If successful, send the printer a print job from the host. In some systems, the printer may not be configured for local screen prints.

Note: If you make any changes to cables, switch settings or the configuration you must power the printer down, pause and then power the printer up again.



**Printek ICX Interface
Figure 1**

SW1-1	Operating Mode			
Off*	Run			
On	Configuration Print / Structured Field Dump			
SW1-5	SW1-4	SW1-3	SW1-2	Default Character Set
Off*	Off*	Off*	Off*	English (U.S.)
Off	Off	Off	On	Brazilian
Off	Off	On	Off	Italian
Off	Off	On	On	Canadian Bilingual
Off	On	Off	Off	Danish/Norwegian
Off	On	Off	On	Spanish Speaking
Off	On	On	Off	English (U.K.)
Off	On	On	On	Portuguese
On	Off	Off	Off	Austria/German
On	Off	Off	On	Japanese/English
On	Off	On	Off	Spanish
On	Off	On	On	Japanese/Katakana
On	On	Off	Off	French
On	On	Off	On	International #5
On	On	On	Off	Belgian
On	On	On	On	Finnish/Swedish
SW1-6	Reserved (Off*)			
SW1-7	Host Initiated Forms Change			
Off*	Enabled			
On	Disabled			
SW1-8	Early Print Complete / Intervention Required Not Reported			
Off*	Enabled			
On	Disabled			
SW2-1	Carriage Return Received @ MPP + 1			
Off*	= CR			
On	= NL			
SW2-2	New Line Received @ MPP + 1			
Off*	= NL			
On	= 2 X NL			
SW2-3	Form Feed Operation			
Off*	FF + SPACE			
On	FF			
SW2-4	Form feed Received @ End of Buffer & SW2-7			
Off*	FF			
On	FF + NL			
SW2-5	Full line of NULLS			
Off*	& Ignore bit is on in PCIA = Don't print Blank Line, no NL			
On	Print Blank Line then NL			
SW2-6	Form Feed Validity			
Off*	FF valid if column = 1 to MPP + 1 else = space			
On	FF valid anywhere			
SW2-7	Automatic Form Feed (used in conjunction with SW2-4)			
Off*	If FF is last byte in buffer then see SW2-4 else if not in column 1 then NL			
On	Insert FF if not at TOF at end of any buffer			
SW2-8	Automatic Form Feed After Operator-Initiated Local Copy			
Off*	Insert FF at end of OILC buffer (overrides SW2-7)			
On	See SW2-7			

* Factory Default Setting Off = 0, On = 1

Configuration Switch Assignments Figure 2

System Installation

When installing the FormsPro 4000 Series ICX printer into the 3270 environment, the following is an example of the system installation procedure. Consult your system administrator for specific installation procedures.

The printer will be installed as a device operating in the LU1-IPDS mode with FM Header support. This is utilized when you require Print Services Facility (PSF) support to perform certain print functions. To install the printer, the following steps are required:

- a. Define to VTAM (Virtual Telecommunications Access Method) and add to or select from a logmode entry a new or existing VTAM Logmode Table.
- b. Define to JES2 (Job Entry System)
- c. Define to PSF/MVS (Print Services Facility / Multiple Virtual Storage)

VTAM Mode Tables

The following should be added to the Local Major Node VTAM definition. The printer will be attached as an LU1-IPDS capable printer.

```
LOC3174 VBUILD      TYPE=LOCAL
LOCPU74 PU         CUADDR=nnn,MAXBFRU=2
LOCPRTK LU        LOCADDR=8,MODETAB=mymodetb,DLOGMODE=LOCPRTK, ISTATUS=ACTIVE
```

Where: *nnn* should be replaced by the channel address of the device.
mymodetb should be replaced by the name of the mode table to be used.

The following table should be added to your VTAM Mode table. This table defines the logmode for a printer owned by VTAM and allows it to run non-SNA data streams. This logmode table may already be saved on your system, or it, along with others, can be found in the VTAM Customization manual.

```
*****
*
*          LUTYPE LU1 for LOCPRTK
*
*****

LOCPRTK  MODEENT LOGMODE=LOCPRTK
          FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',
          SECPROT=X'B0',COMPROT=X'7080',RUSIZES=X'85C7',
          PSERVIC=X'01000000E100000000000000',
          PSNDPAC=X'01',SRCVPAC=X'01'
```

JES2 Definition

The following is an example definition of JES2.

```
FSSDEF  FSSNAME=FSS1,.....
PRT2    FSS=FSS1,Mode=FSS,PRMODE=(LINE,PAGE,SOSI1), CLASS=B,UCS=0,
        SEP, NOSEPDS,CKPTPAGE=100,DRAIN,MARK
```

PSF/MVS Definition

Add the following definition to the PSF STARTUP PROC

```
//PRT2 CNTL
//PRT2 PRINTDEV FONTDD=*,FONT01, /*FONT LIBRARY DD */
// OVLydd=*,OLAY01, /*OVERLAY LIBRARY DD */
// PSEGDD=*,PSEG02, /*SEGMENT LIBRARY DD */
// PSEGDD=*,PSEG02, /*SEGMENT LIBRARY DD */
// PDEFDD=*,PDEF01, /*PAGEDEF LIBRARY DD */
// FDEFDD=*,FDEF01, /*FORMDEF LIBRARY DD */
// JOBHDR=*,JOBHDR, /*JOB HEADER SEPARATOR OUTPUT */
// JOBTRLR=*,JOBTLR, /*JOB TRAILER SEPARATOR OUTPUT */
// DSHDR=*,DSHDR, /*DATA SET HEADER SEPARATOR */
// MESSAGE=*,MSGDS, /*MESSAGE DATA SET OUTPUT */
// FORMDEF=A10110, /*DEVICE FORMDEF DEFAULT */
// PIMSG=(YES,16), /*ACCUMULATE DATA SET MESSAGES */
// DATAck=CLOCK, /*BLOCK DATA CHECKS */
// TRACE=NO, /*BUILD INTERNAL TRACE */
// FAILURE=WCONNECT /*VTAM:ATTEMPT RECONNECT */
// DISCINT=0, /*VTAM:NO TIME OUT */
// MGMTMODE=IMMED, /*VTAM:MAINTAIN SESSION */
// APPLID=PSFAPP1, /*VTAM:APPLID OF PSF */
// LUNAME=LOCPRTK, /*VTAM:PRINTER LOGICAL UNIT NAME */
//PRT2 ENDCNTL
```

Related Reading

For specific system configuration issues, please refer to the following publications:

<u>Document Title</u>	<u>Document No.</u>
An Introduction to the IBM 3270 Information Display System	GA27-2739
Introduction to Programming the IBM 3270	GC27-6999
IBM 3270 Information Display System Configurator	GA27-2076
IBM 3270 Workstation Printer Reference and Install Guide	GG22-9461
3174 Establishment Controller - Functional Description	GA23-0218
Appendix C - 3174 Support of Intelligent Printer Data Stream (IPDS)	
PSF/MVS Systems Programming Guide	S544-3672
A Guide to IBM's Advanced Function Printing	S544-3095
IBM Intelligent Printer Data Stream Reference	S544-3417

Parallel Interface

Refer to the Parallel Interface section of the Installation and Quick Setup chapter of the *FormsPro 4000 Series Operator's Manual*. References to "CX/TX" in the setup menu will now be replaced with "IPDS".

Coax/Parallel Port Arbitration

The parallel port and the coax port may automatically switch back and forth after approximately 29 seconds. Note that the use of this capability requires planning and control on the part of the user and/or system administrator to assure that data from the two ports cannot be "mixed" together.

When data is received from the coax port (after the time-out) the interface will automatically switch to Printek emulation and select the EBCDIC font. When data is received from the parallel port, the interface will automatically switch to the default emulation specified in the Interface menu and select the forms parameters for the current form as specified in the Forms menu.

Serial RS-232C Interface

Refer to the RS-232C Serial Interface section of the Installation and Quick Setup chapter of the *FormsPro 4000 Series Operator's Manual*.

IPDS Programming

The Intelligent Printer Data Stream is a page description language defined by IBM as a structured field data stream for managing and controlling printer processes. IPDS allows a logical page, as set up by the host system, to contain an unlimited variety of different types of data including high quality text, raster images, bar codes, and vector graphs.

The IPDS data is handled as data towers. These data towers include Text, IM Image, IO Image, Graphics, and Bar Code. Each of these towers includes a subset of commands for handling the different data in each.

With the IPDS data stream, the data in these towers can come from different sources or programs on the host system and be merged at the printer. These sources can be Advanced Function Printing Utilities (AFP) or simple text processors. One example of this application would be printing an invoice that would contain a bar code, expanded text, and graphic data along with standard 10 cpi text. This task would be accomplished in two steps.

1. An overlay would be created on the host system using the AFP Utilities. This overlay would call on a page segment (or graphic object) for the company name with address and logo, vector fonts for expanded type, printer fonts for those fonts available in the printer, bar code creation based on changeable data pulled from the host database, and lines and boxes created using the overlay utility. See figure 3 for an example overlay.
2. The changeable data would be used from the database record as it is printed from the application program. This data could include text and numbers for use in bar code creation. When this data is printed the application program would specify a printer definition file to use as the formatting for the print file. When the data is sent to the printer, the changeable data is printed first and then followed by the overlay containing the form. See figure 4 for an example of the completed form.

Form Overlay
Figure 3

Completed Form
Figure 4

Programming for Multiple Drawers(Bins)

The FormsPro 4000 series printers have the ability to select up to ten different forms. The coax host device description must have the form feed value as *AUTOCUT. Auto-configuration handles this on 5219,3812, 3816, & *IPDS devices, but the user must change the description for 4214, 4224 and IPDS types. Thus, to select the multiple forms, the host printer configuration must be set to tractors: 10. The device description form feed value must be *AUTOCUT even though continuous forms are being used. This is because the host system supports multiple bins only with *AUTOCUT. See Examples 1, 2, and 3.

Note: These examples were developed on the IBM AS/400. 3270 users will need to update them accordingly.

```
5738PW1 V2R2M0 920615          SEU SOURCE LISTING          02/04/93 17:31:53

SOURCE FILE . . . . . NATIVE/SRCRPG
MEMBER . . . . . PTK001

SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...//...+... 8
100      H          1                                     // PTK001
200      F*
300      F*          PRINT OUTPUT TO A PRINTEK 4000 - MULTIPLE BINS
400      F*
500      FPRTFPT1 O  F    132    OA    PRINTER
600      FPRTFPT2 O  F    132    OB    PRINTER
700      FPRTFPT3 O  F    132    OC    PRINTER
800      C*
900      C          *ENTRY    PLIST
1000     C          PARM          PRINTR 10
1100     C*
1200     C          EXCPTOUTPUT
1300     C          SETON          LR
1400     O*
1500     OPRTFPT1 E 3 03          OUTPUT
1600     O          24 'THIS IS A TEST OF PRINTE'
1700     O          48 'R OUTPUT TO A PRINTEK 40'
1800     O          72 '03 PRINTER ATTACHED TO A'
1900     O          80 'N AS/400'
2000     O          E 1          OUTPUT
2100     O          24 'COMPUTER. THIS PAGE IS '
2200     O          48 'BEING DIRECTED TO BIN 1 '
2300     O          72 '(FRONT TRACTORS) '
2400     O          E 1          OUTPUT
2500     O          36 'PRINTER ID.....'
2600     O          PRINTR 47
```

Multiple Tractor Selection Example 1

5738PW1 V2R2M0 920615 SEU SOURCE LISTING // 17:31:53

SOURCE FILE NATIVE/SRCRPG
MEMBER PTK001

```
SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...//...+... 8
2700      O          E 1          OUTPUT
2800      O
2900      O
3000      O*
3100      OPRTFPT2 E 3 03          OUTPUT
3200      O
3300      O
3400      O
3500      O
3600      O          E 1          OUTPUT
3700      O
3800      O
3900      O
4000      O          E 1          OUTPUT
4100      O
4200      O          PRINTR
4300      O          E 1          OUTPUT
4400      O
```

5738PW1 V2R2M0 920615 SEU SOURCE LISTING // 17:31:53

SOURCE FILE NATIVE/SRCRPG
MEMBER PTK001

```
SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...//...+... 8
4500      O
4600      O*
4700      OPRTFPT3 E 3 03          OUTPUT
4800      O
4900      O
5000      O
5100      O
5200      O          E 1          OUTPUT
5300      O
5400      O
5500      O
5600      O          E 1          OUTPUT
5700      O
5800      O          PRINTR
5900      O          E 1          OUTPUT
6000      O
6100      O
```

* * * * E N D O F S O U R C E * * * *

**Multiple Tractor Selection
Example 1 (continued)**

Printek ICX Interface

5738PW1 V2R2M0 920615

SEU SOURCE LISTING

SOURCE FILE NATIVE/SRCRPG
MEMBER PTK002

```
SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...//...+... 8
 100      H
 200      F*
 300      F*          PRINT PRINTEK 4003 3-DRAWER TEST USING DDS SPECS AS PRTF
 400      F*
 500      FPTK002  O   E                PRINTER                UC
 600      C*
 700      C          *ENTRY    PLIST
 800      C          PARM          PRTID
 900      C*
1000      C          OPEN PTK002
1100      C          EXCPT
1200      C          SETON                LR
1300      O*
1400      OPAGE1   E
1500      O                *ALL
1600      OPAGE2   E
1700      O                *ALL
1800      OPAGE3   E
1900      O                *ALL
```

* * * * E N D O F S O U R C E * * * *

**RPG Source File For Multiple Tractor Selection
Example 2**

5738PW1 V2R2M0 920615

SEU SOURCE LISTING

SOURCE FILE NATIVE/SRCDDS
MEMBER PTK002

```

SEQNBR*...+...//+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ...+... 8
 100      A*   PTK002
 200      A*
 300      A*   DDS PRTF SPECS FOR PTK002 PGM - TEST PTK 4000 DRAWERS
 400      A     R PAGE1
 500      A
 600      A
 700      A
 800      A
 900      A
1000     A
1100     A
1200     A
1300     A
1400     A     PRTID           10
1500     A
1600     A
1700     A     R PAGE2
1800     A
1900     A
2000     A
2100     A
2200     A
2300     A
2400     A
2500     A
2600     A     PRTID           10

```

5738PW1 V2R2M0 920615

SEU SOURCE LISTING

SOURCE FILE NATIVE/SRCDDS
MEMBER PTK002

```

SEQNBR*...+...//+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ...+... 8
2700     A
2800     A
2900     A     R PAGE3
3000     A
3100     A
3200     A
3300     A
3400     A
3500     A
3600     A
3700     A
3800     A     PRTID           10
3900     A

```

* * * * E N D O F S O U R C E * * * *

**DDS Source File For Multiple Tractor Selection
Example 3**

Code Dump Mode

The code dump mode allows you to print any data received at the coax interface in structured field format. This format separates each command received from the host system on to a separate line. Data is printed continuously until another system command is printed as shown in Figure 5.

The Code Dump Mode is entered by powering on the printer with the interface configuration switch SW1-1 set to ON. The printer will first print the current interface configuration settings and will then print any data received from the coax host.

```
Printek Ipds
Communications Processor ROM: 1762 Revision Level: 01.01.e
Ipds Graphics Processor ROM: 1668 Revision Level: 03.01.c

Ipds Structured Field Dump - Address Switch Is Set To 0 Page 1

2B D2 07 48 00 00 00 00 FE ; .K.ç....Ů
2B D2 0A 48 00 00 00 00 00 00 01 ; .K.ç.....
34 C4 01 ; .D.
2B D2 03 45 FF ; .K.Á.
2B D2 04 0D 00 00 ; .K....
2B D2 0A 85 01 01 02 01 03 02 04 02 ; .K.e.....
2B D2 03 09 02 ; .K...
2B D2 06 11 00 01 7F FF ; .K....".
2B D2 06 01 01 00 00 01 ; .K.....
2B D3 06 F6 00 00 00 00 ; .L.6....
2B D2 0A 48 00 00 01 01 00 00 02 01 ; .K.ç.....
00 ; .
2B D1 07 05 00 0B 00 90 01 ; .J.....°.
2B D2 04 49 00 F0 ; .K.ñ.0
2B D2 06 40 4A 40 3D E0 ; .K. { . \
2B D2 04 15 00 F0 ; .K...0
34 C4 01 ; .D.
2B D1 03 81 FF ; .J.a.
00 ; .
2B C8 03 40 01 ; .H. .
2B D2 03 45 01 ; .K.Á.
2B D2 04 85 00 02 ; .K.e..
2B D2 04 4C 00 00 ; .K.<..
2B D1 03 81 FF ; .J.a.
2B C8 03 40 01 ; .H. .
2B D2 04 29 00 0A ; .K....
2B D2 04 15 00 F0 ; .K...0
2B D2 06 11 02 D0 2D 00 ; .K...}..
2B C6 02 0C ; .F..
2B D2 04 49 03 BF ; .K.ñ.
2B D2 15 01 00 00 00 01 00 00 05 00 00 09 00 00 ; .K.....
28 00 00 2C 00 00 4A ; .....{
06 F1 05 05 40 40 40 40 40 40 40 40 40 40 40 E6 ; .l... W
D6 D9 D2 E2 E3 C1 E3 C9 D6 D5 40 D7 D9 C9 D5 E3 ; ORKSTATION PRINT
C5 D9 40 E5 C5 D9 C9 C6 C9 C3 C1 E3 C9 D6 D5 40 ; ER VERIFICATION
E3 C5 E2 E3 40 40 40 40 40 40 40 40 40 40 ; TEST
34 C0 50 ; .{&
F1 0D 05 05 40 40 40 40 40 40 40 40 40 40 40 E6 ; l... W
D6 D9 D2 E2 E3 C1 E3 C9 D6 D5 40 D7 D9 C9 D5 E3 ; ORKSTATION PRINT
C5 D9 40 E5 C5 D9 C9 C6 C9 C3 C1 E3 C9 D6 D5 40 ; ER VERIFICATION
E3 C5 E2 E3 40 40 40 40 40 40 40 40 40 40 ; TEST
34 4C 03 ; .<.
0D ; .
2B D2 04 0D 01 64 ; .K...Å
F4 E1 E1 E1 E1 E1 E1 E1 E3 88 89 A2 40 97 99 96 ; 4.....This pro
83 85 84 A4 99 85 40 83 81 95 40 82 85 40 A2 85 ; cedure can be se
93 85 83 A3 85 84 40 86 99 96 94 40 A3 88 85 40 ; lected from the
97 99 89 94 85 40 96 97 A3 89 96 95 40 94 85 95 ; prime option men
A4 40 96 86 E1 E1 E1 F4 1E F5 E1 E1 E1 A3 88 85 ; u of...4.5...the
40 A5 85 99 89 86 89 83 81 A3 89 96 95 40 A3 85 ; verification te
A2 A3 A2 4B 40 E3 88 89 A2 40 A3 85 A2 A3 40 97 ; sts. This test p
81 A3 A3 85 99 95 40 89 A2 40 97 99 89 95 A3 85 ; attern is printe
84 40 96 95 40 81 40 E3 C5 E7 E3 E1 E1 E1 F5 1E ; d on a TEXT...5.
```

Code Dump
Figure 5