

RELEASE NOTE FML-8MOD

July 17, 1997

K56flex Modem Function Module

This document describes the new FML-8MOD Function Module and is provided as a supplement to your existing documentation.

We'll start with a few introductory remarks concerning the K56flex technology in general and our modem module in particular. Then we'll give an overview of the module hardware, followed by a description of the modem configuration. Finally we'll give you a short example for setting up the modem module in an everyday situation and explain how to trace a modem connection with the *BRICKware for Windows* software.



Note that the modem modules require BRICK-XL system software **Release 4.5 Revision 1** or later.

Please refer to the separate BRICK-XL System Software Release Note 4.5 for a complete list of new features and bugfixes.

Introduction

K56flex Technology

The K56flex technology offers a new step up in modem speed. In conjunction with digital exchanges it is now possible to achieve data rates of up to 56kbps from central-site modems connected to the ISDN (e.g. internet service providers) to the client modem connected to the analogue telephone network (*downstream*). The other direction—from client to server (*up-*

stream)—still uses the V.34 standard with speeds of up to 33.6kbps.

This technology is especially useful for applications, where the data throughput is typically larger in the server→client direction (*downstream*), e.g. for internet providers.

FML-8MOD

BinTec's new FML-8MOD—function module with eight modems—offers eight modems capable of all current modem standards up to and including K56flex. You can have up to four FML-8MOD modules installed in your BRICK-XL internally, thus offering up to 32 independent analog modems in connection with the FML-MODI modem connector module and a BI-ANCA/CM-PRI S_{2M} module.

Each modem on the FML-8MOD supports the following standards:

Standard	Description
K56flex	56,000, 54,000, 52,000, 50,000, 48,000, 46,000, 44,000, 42,000, 40,000, 38,000, 36,000, 34,000, or 32,000 bps downstream 33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9,600, 7,200, 4,800, or 2,400 bps upstream
V.34	33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9,600, 7,200, 4,800, or 2,400 bps
V.32bis	14,400, 12,000, 9,600, 7,200, or 4,800 bps
V.32	9,600, 7,200, or 4,800 bps
V.23	1,200 bps (1200/75, BTX)
V.22bis	2,400 or 1,200 bps
V.22	1,200 bps
Bell 212	1,200 bps
V.21	300 bps

Standard	Description
Bell 103	300 bps
V.42 LAPM, MNP 2-4, 10	Error correction modes
V.42bis, MNP 5	Data compression

The modems are not bound to a certain B channel, but are allocated to the next free channel as needed. This *dynamic resource allocation and distribution* technology (DRAD) provides for maximum flexibility.

You can easily update the system software for your modem modules by using the *modem* command (see p. 11). This allows you to take advantage of new modem standards—e.g. the upcoming ITU standard for 56k modems—without having to make any hardware modifications.

Hardware

The modem hardware consists of three different components. The FML-MODI (internal modem connector kit) comprises an SBus module which fits into slots 5, 6, or 7 (the extension slot) of your BRICK-XL, and a shuttle frame, which is installed in the lower part of your BRICK and which holds up to four FML-8MOD modem modules.

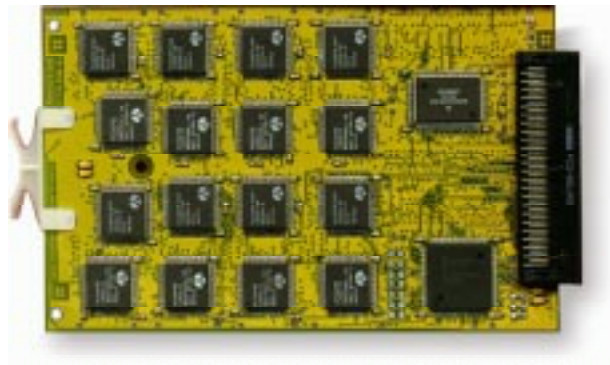


Figure 1: FML-8MOD modem module



The modem modules will always be installed by BinTec or by an authorized BinTec partner.

Software

Configuration

In order to make the modems configurable we had to add a new table (***mdmProfileTable***) to the MIB and modify two existing tables (***isdnDispatchTable*** and ***biboPPPTable***). The Setup Tool was also modified for this purpose.

In this document we'll only describe configuring the modems with the Setup Tool, because that's the easier way.

Main Page

On the main page of the Setup Tool there is a new slot entry—Slot7—for the extension slot.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH mybrick	
Licenses	System		
Slot1: CM-BNC/TP, Ethernet		Slot4: CM-2BRI, ISDN S0, Unit 0 CM-2BRI, ISDN S0, Unit 1	
Slot2: CM-PRI, ISDN S2M		Slot5:	
Slot3:		Slot6:	
WAN Partner IP X.25	MODEM	Slot7: FM-MOD-56K/32	
Configuration Management Monitoring and Debugging Exit			
Press <Ctrl-n>, <Ctrl-p> to scroll through menu items, <Return> to enter			

In our example above slot 7 contains a modem connection module (FM-MOD-56K) with 32 modems available (four FML-8MOD modules are installed).

There is also the new [MODEM] menu, see next section.

Modem Profiles

In the [MODEM] menu you can configure eight different modem profiles. All settings made in this menu show up in the ***mdmProfileTable***.

In theory you could use only one profile, where all values are set to maximum—or auto, where applicable—and let the calling modem negotiate the values it needs.

This will work in most cases—only a few very old modems will not be able to negotiate the necessary values—but it takes much more time than connecting with the proper values in the first place.

Therefore you can use the profiles to grant different user groups different connection modes.

After starting the Setup Tool, go to the [MODEM] [Profile Configuration] menu, and select *Profile 1*. The default settings are shown in the figure below.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[MODEM][PROFILE][EDIT]: Configure Profile		mybrick	
Name	Profile 1		
Description			
Modulation	V.34		
Error Correction	LAPM		
Automode	on		
Min Bps	300		
Max Receive Bps	33600		
Max Transmit Bps	33600		
V.42bis Compression	auto		
MNP5 Compression	auto		
SAVE		CANCEL	
Enter string, max length = 48 chars			

The fields have the following meanings:

Name = Profile 1...8. Cannot be changed.



Note that Profile 1 is used as the *default profile* for modem connections, if no other profile is explicitly specified.

Description = Descriptive string for this profile.

Modulation = modem standard to use, select with the space bar. Values range from K56flex down to Bell 103 (see table on page 2).

Error Correction = select the type of error correction to use.

Value	Meaning
none	Do not use any error correction.
required	First tries LAPM and then MNP5 error correction. If both fail, the modem will hang up.
auto	First tries LAPM and then MNP5 error correction. If both fail, the modem will not use error correction.
LAPM	Selects LAPM error correction. If this fails, the modem will hang up.
MNP5	Selects MNP5 error correction. If this fails, the modem will hang up.

Automode = enable (*on*) or disable (*off*) negotiation of speed and modulation parameters.

Min Bps = the minimum baudrate you want to use with this profile. You can set any speed supported by the current modulation (i.e. standard). Please refer to the table on page 2 for details. The connection will be released, if it cannot at least use the baudrate specified here.

Max Receive Bps = the maximum baudrate you want to use with this profile. You can set any speed supported by the current modulation (i.e. standard). Please refer to the table on page 2 for details.

Max Transmit Bps = only needed in conjunction with the *K56flex* modulation. Sets the maximum transmit baudrate (*»downstream«*, server to client) you want to use with this profile.

V.42bis Compression = enable (*auto*) or disable (*off*) negotiation for using V.42bis compression.

MNP5 Compression = enable (*auto*) or disable (*off*) negotiation for using MNP5 compression.

Incoming Call Answering

The next change concerns the [*Incoming Call Answering*] menu for all ISDN interfaces, which has been changed to contain a list of an arbitrary number of entries rather than a mask with few possible variations. The settings from this menu show up in the *isdnDispatchTable*.



Please refer to section *Partner Management* in chapter 4 of your *User's Guide* for more information on handling lists.

The entries in this list are used to distribute incoming ISDN calls received on this interface to different service items. The BRICK distinguishes incoming calls based on the »Called Party's Number« transmitted with each ISDN call.

Select one of your S_{2M} interfaces, then [*Incoming Call Answering*], and [*ADD*] to create a new list entry.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[SLOT 2 ISDN S2M][INCOMING][ADD]: Conf. Incoming Call Answ.		mybrick	
Item Number Mode	PPP (routing) right to left		
SAVE		CANCEL	
Use <Space> to select			

Item = the ISDN service you want to use for this call. You can select one of the following:

Value	Meaning
PPP (routing)	Default value, good for all PPP connection types listed below (except for the specific PPP Modem Profile 2 ... 8 settings) if the calls are signalled correctly (as is the case in most of Europe). <i>If in doubt, try this value.</i>
ISDN Login	login service
PPP 64k	64kbps PPP data connection
PPP 56k	56kbps PPP data connection
PPP Modem	selects Modem Profile 1 as configured in the [MODEM] menu
PPP DOVB	<u>d</u> ata transmission <u>o</u> ver <u>v</u> oice <u>b</u> earer; useful e.g. in the US where voice calls sometimes cost less than data connections
PPP V.110 (1200 - 38400)	bit-rate adaption according to V.110 (1200 bps, 2400 bps, ..., 38400 bps)
Pots	only useful for V!CAS teleworking routers
PPP Modem Profile 1 ... 8	selects Modem Profile 1 ... 8 as configured in the [MODEM] menu
CAPI 1.1 EAZ 0 ... 9 Mapping	EAZ mapping for CAPI 1.1 applications

Number = the telephone number to use for this item.

Mode = the direction for matching the incoming telephone number (Called Party Number), either starting from the right (*right to left*, this is the default), or from the left (*left to right* (DDI), only useful for the Direct Dial In (DDI) feature of point-to-point ISDN accesses (*Anlagenanschluß* in Germany).

WAN Partner / Outgoing Calls

The last change concerns the [WAN Partner] [Advanced Settings] menu, where you configure ISDN partners.

Here we added the *Layer 1 Protocol* entry, which also shows up in the *biboPPPTable*. This entry only has an effect on outgoing calls to this partner and on incoming calls which are identified by their calling party number. For an outgoing modem connection you should select one of the eight modem profiles.

The Layer 1 Protocol for incoming calls *not* identified by their calling party number—wich will probably the case for most incoming modem connections, as they usually originate from the analogue telephone network, where no calling party numbers are supplied with the calls—is taken from the [*Incoming Call Answering*] settings.

The following table shows the possible values for the *Layer 1 Protocol* entry.



Note that most entries correspond to similar entries in the *Item* field of the [*Incoming Call Answering*] menu.

Value	Meaning
ISDN 64kbps	64kbps ISDN data connection
ISDN 56kbps	56kbps ISDN data connection
Modem	selects Modem Profile 1 as configured in the [<i>MODEM</i>] menu
DOVB	<u>d</u> ata <u>t</u> ransmission <u>o</u> ver <u>v</u> oice <u>b</u> earer; useful e.g. in the US where voice calls sometimes cost less than data connections
V.110 (1200 - 38400)	bit-rate adaption according to V.110 (1200 bps, 2400 bps, ..., 38400 bps)
Modem Profile 1 ... 8	selects Modem Profile 1 ... 8 as configured in the [<i>MODEM</i>] menu

modem Utility

Included with the BRICK's system software is the new *modem* command. You can use this command to update the system software of your FML-MODI modem connector module, or to display the current operating status of all modems.

Software Updates

There are two prerequisites for performing a software update for your modem connector module:

1. You must have configured a TFTP host for your BRICK (for instructions on how to do so please refer to section *System Administration* of your User's Guide).
2. The new modem software image (available from our WWW server) must be located in the TFTP directory of your TFTP host.

Login to your BRICK as user *admin* and then from the SNMP shell prompt issue the command:

```
modem update <TFTP host> <file name>
```

If you supplied the correct TFTP host and file name you will see some screen output concerning the loading and verifying of the image file.

The update application will automatically detect all your modem connector modules and offer you to update each one individually.

```
Perform update for BIANCA/FM-MODI-56K in slot 7 (y or n)?
```

If you reply with »y« the update will be performed. This will take approximately 60 seconds.

After the update is complete you should reboot your BRICK if you immediately want to use the new modem software.

Modem Status

To display the status of all modems issue the following command from the SNMP shell prompt of your BRICK:

```
modem status
```

This will get you a display similar to the one below.

```
No State      OBytes  IBytes  LastMessage
00 IDLE       280     2704   CONNECT 115200/K56/LAPM/NONE/38000:TX/31200:RX
01 IDLE       278     2701   CONNECT 115200/V34/LAPM/V42BIS/33600:TX/33600:RX
02 IDLE       18481   22233  CONNECT 115200/K56/LAPM/NONE/40000:TX/31200:RX
03 CALLING    0        0
04 CONNECTED 59635   64330  CONNECT 115200/V34/LAPM/NONE/33600:TX/33600:RX
05 CONNECTED 407     79     CONNECT 115200/K56/LAPM/V42BIS/36000:TX/31200:RX
06 CALLED     0        0
07 IDLE       0        0
```

The following table explains the possible modem states.

State	Description
IDLE	no modem activity
CALLING	outgoing call being set up
CALLED	incoming call being processed
CONNECTED	connection established,

Example Configuration

Central Site Modem Server

In this example we will show you how to set up your BRICK as a modem server for *incoming* connections, where the callers receive their IP addresses and name servers from the BRICK.

We assume that you are familiar with the basic operation of your BRICK and the Setup Tool. For an introduction to these topics please refer to the *Getting Started* or *Los Geht's* manuals.

Login to your BRICK and start the Setup Tool.

ISDN Partners

We'll start by adding a new ISDN partner for modem connections. Go to the [WAN Partner] menu and select [ADD] to create a new partner entry.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[WAN][ADD]: Configure WAN Partner		mybrick	
Partner Name	Mr. Smith		
Enabled Protocols	<X> IP < > IPX < > BRIDGE < > X.25		
Encapsulation	PPP		
Identify by Calling Number	no		
PPP Authentication Protocol	CHAP and PAP		
Partner PPP ID	smithbrick		
Local PPP ID	mybrick		
PPP Password	secret		
ISDN Ports to use	<X> Slot 3, ISDN S2M < > Slot 4, ISDN S0 (0) < > Slot 4, ISDN S0 (1)		
ISDN Numbers >			
IP >			
Advanced Settings >			
SAVE		CANCEL	
Enter string, max length = 25 chars			

Give the partner a name and enter his PPP ID and the PPP Password to use with this partner.



Make sure that *Identify by Calling Number* is set to **no**—analog modem calls usually do not contain a calling party number—and that you only use S_{2M} ports for modem connections.

You do not need to configure any ISDN Numbers at the moment.

Now go to the [*Advanced Settings >*] menu.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[WAN][ADD][ADVANCED]: Advanced Partner Settings (Mr. Smith)		mybrick	
Callback		no	
Short Hold		3600	
Delay after Connection Failure		300	
Channel-Bundling		no	
RIP Send		none	
RIP Receive		none	
Van Jacobson Header Compression		on	
IP Accounting		off	
Dynamic IP-Address Server		on	
Layer 1 Protocol		ISDN 64 kbps	
Provider Configuration >			
	OK		CANCEL
Use <Space> to select			

The standard value for the *Short Hold* time (20 seconds) is too short for many modem connections—a typical modem call set-up can easily last 30-50 seconds or longer—so you’ll have to select a larger value. We chose **3600** seconds (1 hour), which—for all practical purposes—is equivalent to an infinite time, i.e. modem connections will only time out after 1 hour of inactivity. This is ok, because the connections to a central site server are usually initiated and closed by the client modem.

Set the *RIP Send* and *RIP Receive* fields to **none**.

Switch **on** *Van Jacobson Header Compression*, this will slightly improve your data throughput by reducing IP headers from 40 bytes to about 8 bytes per packet.

Switch **on** *Dynamic IP-Address Server*, this will allow the clients to get their IP addresses and name servers from your

BRICK. For information on setting up a *Dynamic IP-Address Server* in the [IP] [*Dynamic IP Addresses (Server Mode)*] menu please refer to the User's Guide.

Confirm your settings with [OK] and [SAVE] this partner.

You could now go on and add a few more partners in the same manner.

Modem Profiles

Next we'll define a new Modem Profiles for fast K56flex modem connections.



As a default all eight modem profiles are set up for automatic speed and modulation negotiation, so that all modems from slow V.21 / 300bps types up to V.34 / 33,600bps types will be able to connect to your BRICK.

Go to the [MODEM] [*Profile Configuration*] menu and select Profile 2. Leave Profile 1—which is the default profile for all modem connections where no specific profile is specified—as it is for the time being.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[MODEM][PROFILE][EDIT]: Configure Profile		mybrick	
Name	Profile 2		
Description	K56flex hi-speed		
Modulation	K56flex		
Error Correction	auto		
Automode	on		
Min Bps	28800		
Max Receive Bps	33600		
Max Transmit Bps	56000		
V.42bis Compression	auto		
MNP5 Compression	auto		
SAVE		CANCEL	
Enter string, max length = 48 chars			

Enter a description for this profile, select K56flex modulation, set the Error Correction to auto, and modify the data rates as indicated above. This profile will then only accept connections where at least 28,800bps are possible.

[*SAVE*] the profile.

You can also modify the other profiles to fit your demands.

Incoming Call Answering

Finally select the [*CM-PRI, ISDN S2M*] [*Incoming Call Answering*] [*ADD*] menu to configure a few telephone numbers for incoming modem connections.

BIANCA/BRICK-XL Setup Tool		BinTec Communications GmbH	
[SLOT 2 ISDN S2M][INCOMING][ADD]: Conf. Incoming Call Answ.		mybrick	
Item Number Mode	PPP Modem Profile 2 54302 left to right (DDI)		
SAVE	CANCEL		
Use <Space> to select			

In the Item field select the modem profile you want to use for this ISDN number, Modem Profile 2 (K56flex hi-speed) in our example.



Make sure that the number entered here exactly matches the called party number delivered with an incoming call. This is the number of your S_{2M} access plus the in-dialling number you want to use for this modem profile.

If in doubt, there is a rather easy way of finding out this number. *Do this only after you completed the rest of your configuration!* Leave the Setup Tool and issue the `debug all` command on your BRICK. Then call the number of your S_{2M} access from any tele-

phone, then dial a few more digits and hang up. You will see an output similar to the following:

```
DEBUG/PPP: dialin from <> to local number <5430>
DEBUG/PPP: no matching dispatch table entry
DEBUG/PPP: dialin from <> to local number <54302>
DEBUG/PPP: ?: call accepted, call not identified by number
```

Press Ctrl-C to stop the debug output and note down the local number from the line immediately above the »no matching dispatch table entry« message. This is the way your number is signalled. In the [*Incoming Call Answering*] menu simply enter this number and append the in-dialling number to it.

For S₂M interfaces *Mode* must be set to **left to right (DDI)**.
[SAVE] the entry.

Now [ADD] another entry with a different *Number*, e.g. 54301, for Modem Profile 1.

Callers with K56flex modems can now use the number 54302, and all other callers can use the number 54301.

Enable Outgoing Calls

To enable outgoing modem connections to certain partners, e.g. for use with the Callback feature, go to the [*WAN Partner*] menu and select one of the partners already configured.

Go to the [*ISDN Numbers >*] menu and enter the number this partner can be reached at for modem calls.

You can then go to the [*Advanced Settings*] menu, and modify the settings as needed, e.g. enable Callback if desired, or reduce the Short Hold time, so that outgoing connections do not need one hour to time out, etc.

As a final step select the modem profile you want to use with this partner as *Layer 1 Protocol*.

[SAVE] your settings.

Now the partner can also be called using one of your BRICK-XL's modems.

Tracing a Modem Connection

You can use the *BRICKware* software package included on your Companion CD to trace modem connections.



Tracing modem connections can be especially useful when troubleshooting connection problems.

We'll assume that you have already installed *BRICKware* on your PC according to the on-line documentation.

Then with your PC connected to the same LAN as your BRICK start *DIME Tools* and select *New ISDN Trace* from the *File* menu. This will get you the following dialog box.



Make sure to select *Asynchronous HDLC*, *PPP* and *TCP/IP* in the Trace mode area of the dialog.