ascom *Digital Fax Router*

USER GUIDE

Contents

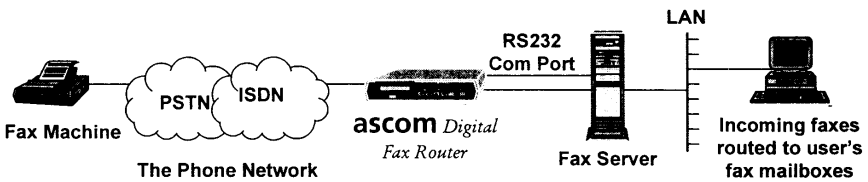
I. General Description

The Ascom Digital Fax Router is all the hardware your fax server software needs. It provides two channels of analogue "Class 1/2" fax & voice modem technology, in an ISDN package. Most fax server software supports the server PC's COM ports, and the Ascom Digital Fax Router's RS232 ports are normally connected to these. A particular benefit that the Ascom Digital Fax Router brings to the fax server system is the enabling of direct faxing to the desk using ISDN DDI. This uses the same facility of the phone network as a PBX does, to give extension phone users their own direct dial phone numbers.

A. DDI - Direct Dialling Inwards

The Ascom Digital Fax Router is a dual-channel fax modem that allows your fax server to give everyone on a network their own fax number. It does this by translating the unique DDI (Direct Dialling Inwards), or MSN (Multiple Subscriber Numbering) phone/fax number provided by the phone network into a routing code for that user that the Fax Server understands. This is the modern ISDN equivalent of what USA product literature may refer to as a "DID Trunk" (which is analogue, and incoming only).

The Ascom Digital Fax Router achieves this by using the DDI facility of the ISDN network connection, to obtain the fax number which the caller actually dialled. Note that the person sending the fax does not need to be attached to ISDN, and can be faxing from any fax machine anywhere in the World. The caller dials a "normal" fax number, and the fax arrives automatically, directly, confidentially, and 100% reliably, in the right user's fax mailbox. Depending on the particular LAN fax server software in use, and the way it is set up, the user will immediately be alerted to the presence of the incoming, confidential fax message.



B. Modem Protocol Set

If there is not a specific driver for the Ascom Digital Fax Router listed in your software you should select something like, "Generic Rockwell Class 2 Fax & Voice Modem". But preferably you should refer to your software supplier for guidance. The Ascom Digital Fax Router supports Class 1 and Class 2 protocols (not the Class 2.0 standard).

(Although the primary role of the Ascom Digital Fax Router is as a voice & fax modem, it also performs as a data modem, conforming to V32bis, V42bis, V42 standards)

C. Routing Options

There are two ways in which the Ascom Digital Fax Router can be set to signal the routing code (the DDI code received from the phone network):

a) DTMF Routing
In this, the normal method, appropriate to most platforms, the Ascom Digital Fax Router signals the DDI code to the fax server at the start of an incoming call using "DLE shielded ASCII codes", just as though the caller had pressed those "Touch Tone", DTMF keys on his phone/fax machine.

b) RS232 Routing
Certain fax server systems that do not support DTMF routing are able only to accept the routing code via a separate RS232 port. The Ascom Digital Fax Router sends the code, tagged with which channel number.

Note that to work with the Ascom Digital Fax Router, a fax server should often be set up for "DTMF Routing", even though it is in fact going to achieve ISDN DID/DDI routing.

II. Specifications

A. Connections

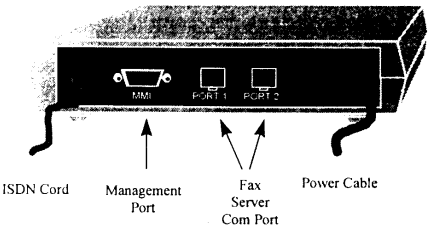
The Ascom Digital Fax Router has an RJ45 connection to the ISDN network and presents two 1m. long 9-way RS232 cables terminated in 9-way DB-9F connector to enable direct attachment to a Fax Server PC's COM ports.

An additional 9-way RS232 connector is provided for PC attachment for engineering purposes for configuration and control as necessary (This connector is also used for the "RS232 Routing" option by those fax servers systems that do not support DTMF Routing), and an LCD front panel for basic configuration and monitoring.

B. ISDN Network Requirements

The Ascom Digital Fax Router requires a Basic Rate ISDN circuit. For example, in the UK this will be British Telecom's ISDN-2 service. This must be ordered to support either DDI or MSN, to present call routing information to the Ascom Digital Fax Router.

On certain Euro-ISDN Networks, notably in Germany and the Benelux, Basic Rate Euro-ISDN comes in two different set-up: Point to Point (Anlagenanschluß in German) and Point to Multipoint (Mehrgerätesanschluß). Point to Multipoint is usually associated with MSN but limited to 8 different numbers, Point to Point is the set-up used for PABX connections which offer a virtually unlimited number of DDI numbers. If your application requires to route fax to more than 8 persons, then you will need to consider to use Point to Point and to configure the Ascom Digital Fax Router accordingly.



ISDN Connection	The ISDN cord is terminated with a standard RJ45 connector for connection to Basic Rate ISDN circuits.
Modem Connections	The rear of the Ascom Digital Fax Router has sockets labelled 'PORT 1' and 'PORT 2'. Cables are supplied to terminate these in conventional RS232 DB-9F connectors.
Management & Maintenance Interface	This is used for a PC connection for system management, software upgrade, etc., and for the RS232 routing option.
Front Panel	LCD display and control buttons to allow configuration changes.

C. General

Power supply:	220 - 240V, 50/60 Hz.	Power consumption 25 VA
Operating environment:	Temp.: 5 Deg. to 40 Deg. C.	Humidity: 5% - 85% non-condensing.
Dimensions:	250(W) mm, 275(D), 60(H)	Weight: 2.8 kg

III. Front Panel Indicators and Controls

A. LCD Display

A 16 character LCD is provided for configuration and diagnostics. In its default state it displays information about channel activity. When in this passive monitoring mode, the LCD is divided into two independent, 8-digit halves. The left for channel one, the right for channel two. The tables below show the display messages and meanings.

Incoming call Sequence

(The dots shown indicate blank character positions in the display)

Display	Comments
IDLE....	This channel is available.
RINGING.	An incoming call from ISDN is being presented to the fax server. The flashing is as per the cadence.
ANSWER..	The Fax Server tells the fax modem to go "Off Hook".
RT.12345	The composite Routing Code (RT), only the last 4 digits will be visible.
LINKED..	The ISDN call is answered by the Digital Fax Router, and the channel is opened end to end. When the Host software puts the modem in fax mode the calling party hears the fax tone from the fax modem in the Digital Fax Router, and fax reception follows.
DISCOND.	When the incoming ISDN call is cleared from the ISDN network this message shows until the fax modem goes On Hook.
IDLE....	The channel is again available.

Outgoing Call Sequence

It should be noted that phone network tones such as BUSY, ENGAGED, NUMBER UNAVAILABLE, etc. are not generated by the Digital Fax Router. The tones are manufactured in the phone network, at the last phone exchange before the called fax machine, or in the PABX that the called fax machine is behind.

Display	Comments
IDLE....	This channel is available.
OFFHOOK.	Preparing to dial (normally too brief to be seen).
DL.7123.	Number dialled scrolled horizontally through 4 char field.
LINKED..	Analogue channel open end to end.
DISCON..	Call cleared by fax server instructing the Ascom Digital Fax Router to go On Hook.
IDLE....	The channel is again available.

B. LED Displays

Five LED's are provided for confirmation of the operation of the Ascom Digital Fax Router, their functions are as follows;

Designation	State	Operation
Ready	• Off • On • Flashing	• Non operational • Operational • Fault
Network	• Off • On • Flashing[1]	• ISDN not connected[2] • ISDN connected • ISDN idle, connected but not established
Port 1, Port 2	• Off • On • Flashing	• Ready to send/receive fax • Sending/receiving fax[3] • Ringing (incoming call)
Service	• Off • On • Flashing	• Normal operation • Service mode active • System configuration being updated

IV. Installation

The initialisation routine in the Ascom Digital Fax Router advertises its presence to the network on power-up. It is therefore important to make the connection to the ISDN network before powering up the Digital Fax Router. (alternatively, if you do need to make the ISDN connection from an already powered up Ascom Digital Fax Router , press the rightmost four buttons in a left to right sequence to reset the unit - i.e. Up/Down/Select/Service).

There is no danger to either the network or the unit if this guidance is not followed, but it can take the ISDN Exchange longer to "notice" the Digital Fax Router's existence if the ISDN connection is made from an already powered-up unit.

With no RS232 connections to the Ascom Digital Fax Router , an incoming call should cause the Port 1, Port 2 lamp to flash with the ringing cadence. It is recommended that the basic operation of the Ascom Digital .Fax Router is verified by using a simple communications program, such as Windows' Terminal, to make and receive calls.

[1] **Note:** The network LED flashing indicates Line Power but no Protocol.
[2] **Note:** Some PABX's provide no line power to the S-Bus, and therefor the LED remains OFF.
[3] **Note:** During an Outgoing call, the LED only will light once the call is answered.

V. Front panel Configuration

The following sections show how to configure the Ascom Digital Fax Router from the front panel.

A. Use of the front panel - an example

To activate the front panel you must press the 'Service' button on the far right hand side of the front panel. This will move you from the status display to the configuration level of the menu tree. The 'Service' LED will illuminate to confirm that you have entered service mode. (For a diagram of the menu structure see section B)
Navigation through the menus is by means of the cursor buttons on the front panel, with the 'Select' button used to select parameters for changing, and as an enter key. For example, to set a Preamble of '12' proceed as follows:

Action	Display Contents
Initial display	IDLE IDLE
'Service' to enter service mode.	CONFIGURATION
Down Arrow three times, to reach Preamble field (already set here to 33)	Pream = 33
'Select', resetting the parameter to its default value of 'OFF'.	Pream = OFF
Set first digit using up and down arrows (i.e. '1')	Pream = 1
'Select' button to fix first digit (cursor disappears)	Pream = 1
'Select' again, confirming you want to enter another digit (cursor appears)	Pream = 1
Set next digit using up/down arrows (i.e. '2')	Pream = 12
'Select' button to fix the second digit (cursor disappears)	Pream = 12
Down Arrow moves on to the next field in the menu (set to '01' already).	MSnlen = 01
'Service' to leave Configuration Mode. Lamp flashes as update is done.	IDLE IDLE

The same basic method is used to set all user-accessible parameters:

Up/Down Buttons

If a cursor is present, then the value of the character that it underlines can be varied by the up/down buttons. But if there is no cursor showing (because you pressed the Select button) then the value shown in the field is what will be fixed, when the field is exited by the up/down buttons.

Select Button

When setting a value in a character position in a field with up/down buttons, pressing Select means, "Yes, that's right", and the cursor disappears. If you press Select again the cursor appears in the next character position. If you don't press Select again, the up/down button takes you out of the field (as above).

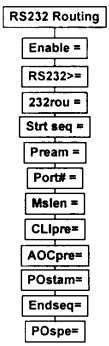
Left/Right Buttons

These are only used on entry to Service Mode to move between the Configuration Menu (as above) and the Stats/Diagnostics Menu.

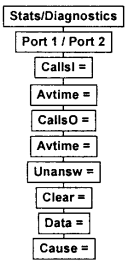
Note that any configuration changes only take effect when the "service" button is pressed, to exit Service Mode.

a) RS232 Routing Configuration

(This is not relevant to most applications of the Digital Fax Router, and should be set to Enable = OFF", as per the factory default)



b) Statistics/Diagnostics Menu



Port 1 / Port 2 - Left, Right selects which port's statistics.
CallsI= No. of incoming calls since PoR (power on reset).
Avtime= Average duration of these calls.
CallsO= Number of outgoing calls since PoR.
Avtime= Average duration of these calls.
Unansw= No. of unanswered incoming calls since PoR.
Clear= Total of CallsI + CallsO + Data
Data= Number of data calls since PoR
Cause= Cause Code for last call clear.

B. General Data Menu

S/W Vsn	Software version (based on date)		Default
Pream	Preamble - a digit string which can be used to identify that the number following is a routing address, or just to pad it out to a certain length.	0 to 15 digits	**OFF**
MSnlen	MSN length - This is the number of trailing digits sampled from the incoming number for routing purposes.	0 to 15	**01**
DDIlen	**For use only in certain countries, such as Germany:** DDI length - Total length of a DDI no. passed by the local PTT Exchange to the Ascom Digital Fax Router , i.e. the longest DDI phone number subscribed to.	0 to 15	**00**
Phys	Port number that incoming calls go to: 1, 2, or next available.	0, 1, or 2	**0**
Postam	Postamble - This is a digit string which may be needed by the host fax system to indicate the end of the routing address.	0 to 15 digits	**OFF**
MMISpe	Speed at which the MMI port communicates	1.2 kbs - 115.2 kbs	**57600**
Rdelay	The delay that the Ascom Digital Fax Router puts between answering a call and sending the routing digits	0 to 2.5 sec	**000**
Rinter	Specifies the duration of the pause between routing digits	000 to 2.5sec	**000**
BEARER	Capability used by ISDN for fax transmission **(By Default in France = AUDIO)**	SPEECH or AUDIO	**SPEECH**
CLIrou	CLI information delivered, if CLI option is enabled on ISDN line	OFF or ON	**OFF**
CLISep	Separator used between DDI and CLI strings 2 Hex characters must be used (i.e. 20 = space)	2 HEX digits	**OFF**
TEI	This specifies the ISDN line type in all European countries except UK & France. PTMP = Point to Multipoint PTP = Point to Point The Ascom Digital Fax Router **MUST** be disconnected from the ISDN line to change this option.	PTMP or PTP	**PTMP**

The delivered composite routing string is:-

[preamble][ddd] [postamble][CLI Separator][ccc]

where:

n - ddd is the last "n" digits of the MSM/DDI number, where "n" is defined by Msnlen parameter.

n - ccc is the Caller ID string delivered by the telephone network.

C. Country-Specific Settings

UK example:

A 20 digit DDI number range is subscribed to from British Telecom, e.g. (01276) 417900 to (01276) 417919. Therefore the MSN length is set to 2, to get the significant last two digits. But if the particular fax server software needs a 4-digit routing code, the Preamble can be set to 10. Further, if the particular fax server software likes to have the DTMF string terminated by a "#", instead of waiting to time out, a Postamble can be set to #. The composite routing code will then be 1000# to 1019#.

German example:

German phone numbers can be extended, by the size of the number range subscribed to. The Ascom Digital Fax Router needs to know the length of the longest DDI phone number are it is to receive. That information is put into the "DDIlen" parameter, in the table above. For example, if a firm's main number is (089) 36 083-0, and a person's direct fax server number has the last zero replaced by 3-digit code such as (089) 36 083-123, DDIlen would be set to 11, and MSN would be set to 3.

D. Programmers' information

The Rockwell firmware in the Rockwell controller is modified only to the very minimum necessary to enable call set-up and clear down to be accomplished by the ISDN software. Software developers should contact Ascom Telecommunications who can arrange for the supply of a copy of Rockwell's "AT Command Reference Manual for RC144ACi, RC144ACL, and RC144ACG Modem Families" [Rockwell Order No. 883].
But from the following, programmers who may already have a Class 1 or Class 2 driver can see how close they already are to supporting the Ascom Digital Fax Router.
The Ascom Digital Fax Router signals DDI (& CLI) data to the Host system as though it were a caller entering that data as a DTMF digit string. And so systems which already support "DTMF Routing" for Class 1 or Class 2 fax modems should need no modifications.
The Host system must initialise the Ascom Digital Fax Router into "voice mode" with the **AT+FCLASS=8** command, and when an incoming call arrives the Ascom Digital Fax Router makes a normal response of **VCON** (confirmation of incoming call connected in voice mode). The only difference of the Ascom Digital Fax Router from "normal" Rockwell operation is that it is immediately following VCON that the Ascom Digital Fax Router sends the DTMF "<DLE> Shielded" ASCII character string, corresponding to the configured DDI routing code.
The Host software's <waiting for DTMF digits> state will typically be exited by reason of one of:

- enough digits received
- terminating digit received (e.g. "#")
- time-out expired
- calling CNG tone (<DLE> c) received

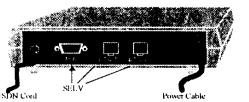
and the Host will then set the modem in fax mode to receive the fax (**AT+FCLASS=1** or **AT+FCLASS=2**).

AOC, Advice of Charge, where available from the ISDN network, is signalled at the end of an outgoing call by the Host using the **ATS34=?** information request. The information returned is for the last outgoing call on that channel.

VI. Appendix: EC Statutory Requirements

The Ascom Digital Fax Router has no mains isolating switch and the mains plug must be removed from the mains socket to isolate the device from the mains. Always ensure that the socket is safe by first isolating the socket by placing the socket switch in the OFF position.

A. Safety Extra-Low Voltage (SELV)

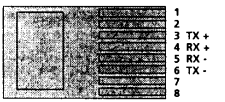


The two RJ45/RS232 ports, PORT 1 & 2, and the MMI RS232 port, as illustrated here, are declared as safety extra-low voltage (SELV) accessory ports which are solely for connection of accessories that do not use or generate voltage greater than that defined for a SELV circuit.
Descriptions of these connection points are given in sections A1.2 and A1.3. The following diagram shows the location of all the SELV ports.
The mains supply is declared as an excessive voltage port. The fuse in the mains plug should only be changed with a standard 3 amp fuse.

B. Connection Points - Main Board

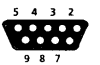
J1- ISDN Interface Connector

A 4 pin connector provides connection to the ISDN network. The other end of the integral cable has a RJ45 plug. The following describes the pin out of the RJ45 plug.



ISDN Cord - RJ45 Plug End

J4- MMI RS232 Connector



The RS232 connector is a DB9 female type connector and the interface supports RXD, TXD, DTR, DSR and CTS signals.

Pin	Signal
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	
8	CTS

WARNING - When using your MMI port, it is a condition of the approval that the cable length does not exceed three metres (3m).

C. Connection Points - Digital Board

J1- RJ45 Connector - PORT 1
J2- RJ45 Connector - PORT 2
A converter cable is provided for these RJ45 sockets, terminating in a standard DB-9F connector.

D. Radiated Emissions

WARNING - This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

VII. Configuration Sheet

Below is a table with all of the options available to change via the front panel, and the factory default settings. If any options have changed after installation please fill out the form below and fax it the Tech. Support Dept.(+44 (0)1276 417920) so we can keep our records up to date.

Company Name	
Contact Name	
Phone Number	
ISDN Number	
Serial Number	
Fax Software	

Option	Factory Default	New settings
S/W Vsn	**020896D0**	
Pream	**OFF**	
MSNlen	**01**	
DDIlen	**00**	
Phys	**OFF**	
Postam	**OFF**	
DLEch	**10**	
MMIspe	**57600**	
Rdelay	**000**	
Rtime	**009**	
Rinter	**000**	
Bearer	**SPEECH**[4]	
CLIrou	**OFF**	
CLIsep	**OFF**	
TEI	**PTMP**[5]	

COMMENTS:

[4] **Note:** In France the Factory Default is Set on AUDIO
[5] **Note:** In coutries other than France or the UK, this setting needs to be changed to PTP to connect to line with more than 8 DDI numbers.