

Model 560-5302
Network Interface Card

Serial Number _____
February 27, 2004

NIC Port Settings

Record NIC Option Card Ethernet parameters below, for quick reference.

NET Port Ethernet Address: _____

NET Port IP Address: _____

NET Port Subnet Mask: _____

NET Port Default Gateway: _____

**Model 560-5302
NIC Option Card Manual**

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SECTION ONE

1. GENERAL INFORMATION

1.1. OVERVIEW

This manual provides the user of a 560-5302 card, referred to as NIC in this manual, all the information necessary to install, set up, and utilize the card. The 560-5302 card provides a network interface for the 560-5301 Fault Monitor/CPU card as well as providing a user RS-232/RS422 serial interface. The network interface allows the user to remotely monitor/control the 560-5301 Fault Monitor/CPU (56K system) over the Internet.

Please note that the 560-5302 NIC card is NOT fully compatible with the prior version of the fault monitor/CPU card (560-5179). The 560-5302 NIC option card requires a 560-5301 fault monitor/CPU card for proper operation.

This manual will discuss the command line interface to the 56K system. This interface consists of the serial port and the NET port using Telnet. Network port access may also be made with the HTML protocol. The NIC card is able to serve Web pages that provide 56K-system status and control. Access may be made with any standard Web-browser. Refer to the 56K-system documentation for details on the Web page interface. The NET port also provides NET port access via the SNMP protocol. The NIC card can set traps based on 56K alarms. Refer to the 56K system documentation for details on the Web page interface.

The NIC has a RJ-45 Ethernet connector, labeled NET and a DB-9 Serial port connector, labeled SERIAL. The NIC SERIAL port may be configured for either RS-232 or RS-422 (jumper setting).

The NIC offers 'pass-through' access to the 560-5301 Fault Monitor/CPU card using either the SERIAL or NET port. The NIC Serial and NET port ASCII strings (commands/requests) are the same as those defined in the 560-5301 Fault Monitor/CPU manual. The NIC card has additional commands that are specific to NIC control.

In addition to the SERIAL and NET ports, the NIC card provides the 560-5301 Fault Monitor/CPU card's Primary (P), Secondary (S) and Tertiary (T) status inputs on BNC connectors. An audio alarm (beeper) that is controlled by the 'host' 560-5301 Fault Monitor/CPU is included on the card. The NIC may include two Alarm Relays (560-5302R OPTION) that are controlled by the Fault Monitor/CPU. Note that when the Alarm Relay option is ordered, an additional single slot barrier strip panel is provided with the NIC.

1.1.1. PHYSICAL SPECIFICATIONS

Height:	11 cm (4.4 in)
Width:	2 cm (0.8 in)
Depth:	13 cm (5 in)
Weight:	≈ 1/4 kg (1/2 lb)

1.1.2. ENVIRONMENTAL SPECIFICATIONS

Storage Temp:	-40° to +85°C
Operating Temp:	0° to +50°C
Humidity:	Up to 95% Relative, Non-Condensing
Cooling Mode:	Convection

1.1.3. POWER REQUIREMENTS

Voltage:	±5 VDC (provided by 560-5301 assembly)
Power:	1 W

1.1.4. CARD COMPATIBILITY

The 560-5302 NIC card must be installed directly behind the 560-5301 Fault Monitor/CPU card. The 560-5301 card MUST be configured for RS-232 operation (SW3-1 ON).

1.1.5. ETHERNET INTERFACE

The Ethernet Interface connector (NET port) on the NIC card is a standard RJ-45 female socket. It conforms to standard Ethernet signal levels.

1.1.6. SERIAL PORT I/O SIGNALS

Use 560-5302 JP4 to select RS-232 or RS-422 operation:

JP4 1-2 selects RS-232

JP4 2-3 selects RS-422

Fixed Serial Protocol: ASCII, 9600 Baud, 8 Data, No parity, 1 Stop

<u>PIN NAME</u>	<u>SIGNAL</u>	<u>PIN</u>
OUT1	560-5301 Alarm (TTL)	1
RxD	RS-232 Input	2
TxD	RS-232 Output	3
OUT2	560-5301 Alarm (TTL)	4
GND	Signal Ground	5
RIN-	-RS-422 Input	6
RIN+	+RS-422 Input	7
TOUT-	-RS-422 Output	8
TOUT+	+RS-422 Output	9

1.1.7. ALARM OUTPUT SIGNALS

The OUT1 and OUT2 Alarm outputs are generated on the 560-5301 Fault Monitor/CPU card and are passed through to the 560-5302 NIC card (refer to the 560-5301 manual). The alarm outputs are 5V CMOS level signals, 10 mA. The outputs are active-high.

1.1.7.1. OUT1: (Composite Fault Active since Last Clear)

The OUT1 signal is available on Serial port connector PIN 1. This signal may also be configured to drive an Alarm Relay (OPTION). The Alarm Relay option requires an additional barrier strip rear panel (one card slot).

1.1.7.2. OUT2: (Fault Currently Active)

The OUT2 signal is available on Serial port connector PIN 4. This signal may also be configured to drive an Alarm Relay (OPTION). The Alarm Relay option requires an additional barrier strip rear panel (one card slot).

1.1.7.3. MAJORALARM: (TBD)

The Majoralarm signal is not available at this time.

1.1.7.4. MINORALARM: (TBD)

The Minoralarm signal is not available at this time.

1.1.8. STATUS INPUT SIGNALS

The BNC connectors on the NIC card are status inputs that connect to the 560-5301 Fault Monitor/CPU card (refer to the 560-5301 manual). The status inputs are TTL level signals

with 4.7 kΩ pull-up resistors.

P: Primary Fault Input
S: Secondary Fault Input
T: Tertiary Fault Input

1.1.9. AUDIO ALARM (BEEPER)

The 560-5302 card includes an audio alarm (beeper). The beeper is controlled by the Fault Monitor/CPU card (refer to the 560-5301 manual). The beeper may be hardware disabled on the 560-5302 card (disabled = JP2 OFF).

1.1.10. STATUS LEDs

The RJ-45 NET port connector includes status LEDs that are visible on the NIC's panel. The green LED on the bottom is an indication of the network connection speed; 100 baseT operation the LED is on, 10 baseT the LED is off. The top LED is yellow to indicate a network connection, off when disconnected.

1.1.11. ALARM RELAYS (OPTION)

The Alarm Relay option provides two Form C relays that may be used to signal an alarm. These relays are energized when no alarm is present and de-energized under the conditions of alarm or loss of power. Note that this option includes an additional one-slot barrier strip rear panel that should be mounted in the 56K chassis one slot to the left of the 560-5302 card (viewed from the rear of the chassis).

The OPTIONAL Alarm Relays have the following contact ratings:

Ratings (resistive load):	1 A 30 VDC/0.5 A 125 VAC
Max. Switching Power:	30 W DC/62.5 VA AC
Max. Switching Voltage:	220 VDC/250 VAC
Max. Switching Current:	1 A DC/AC

The barrier strip rear panel plate connects to the 560-5302 card via a 10-pin Molex connector. This keyed connector must be mated with the J1 connector on the 560-5302 card. The barrier strip panel marking has the following meaning:

C1	=	Common contact of relay controlled by OUT1 signal
NC1	=	Normally closed contact of relay controlled by OUT1 signal
NO1	=	Normally open contact of relay controlled by OUT1 signal
C2	=	Common contact of relay controlled by OUT2 signal
NC2	=	Normally closed contact of relay controlled by OUT2 signal
NO2	=	Normally open contact of relay controlled by OUT2 signal
J2	=	Reserved (BNC location)
J1	=	Reserved (BNC location)

Alarm States: The marking of the barrier strip indicates the alarm state:

C1 and NC1 connected = Alarm C1 and NO1 connected = No Alarm
C2 and NC2 connected = Alarm C2 and NO2 connected = No Alarm

SECTION TWO

2. OPERATION AND INSTALLATION

2.1. OVERVIEW

The NIC card is an option for use with the 560-5301 Fault Monitor/CPU card. The NIC card provides a network interface to the Fault Monitor/CPU card in addition to a serial interface that supports both RS-232 and RS-422.

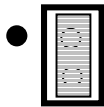
The NIC card is powered by the 'host' 560-5301 Fault Monitor/CPU card and is therefore not designed to be a 'hot swappable' type card, although it can be plugged in 'hot' without damage. The user must configure the NIC card jumpers and then install the card directly behind the 560-5301 Fault Monitor/CPU card.

The NIC communicates with the Fault Monitor/CPU with an RS-232 interface. The 560-5301 card MUST be set for RS-232 operation (560-5301 SW3-1 = ON).

The user must provide a terminal (RS-232 or RS-422) for NIC set-up parameters and an Ethernet network connection. Once the NIC card has been set-up, the card retains all configuration data in Non-volatile memory.

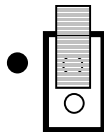
2.1.1. 560-5302 JUMPERS ● = Pin 1

2.1.1.1. JP1 (Fault Monitor/CPU Reset)



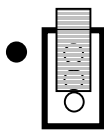
This is the 560-5301 Fault Monitor/CPU remote reset enable jumper. When JP1 is ON, the NIC card has the ability to reset the 'host' 560-5301 card. This feature is required for 560-5301 remote program download support. The factory default is ON (560-5301 remote reset enabled).

2.1.1.2. JP2 (Beeper)



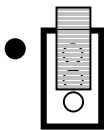
This two-pin jumper is the hardware enable for the audio alarm (beeper). When JP2 is ON, the beeper is enabled and under the control of the 560-5301 Fault Monitor/CPU card. The factory default is OFF (beeper disabled).

2.1.1.3. JP3 (only when Alarm Relay Option is installed)



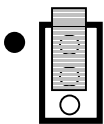
This three-pin jumper switches the OUT2 and MINORALARM signals from the 560-5301 Fault Monitor/CPU for NIC Alarm Relay control. JP3 1-2 = OUT2 control. JP3 2-3 = MINORALARM control. The factory default is 1-2 (OUT2 relay control). OUT2 = Fault Currently Active.

2.1.1.4. JP4 (Serial port configuration)

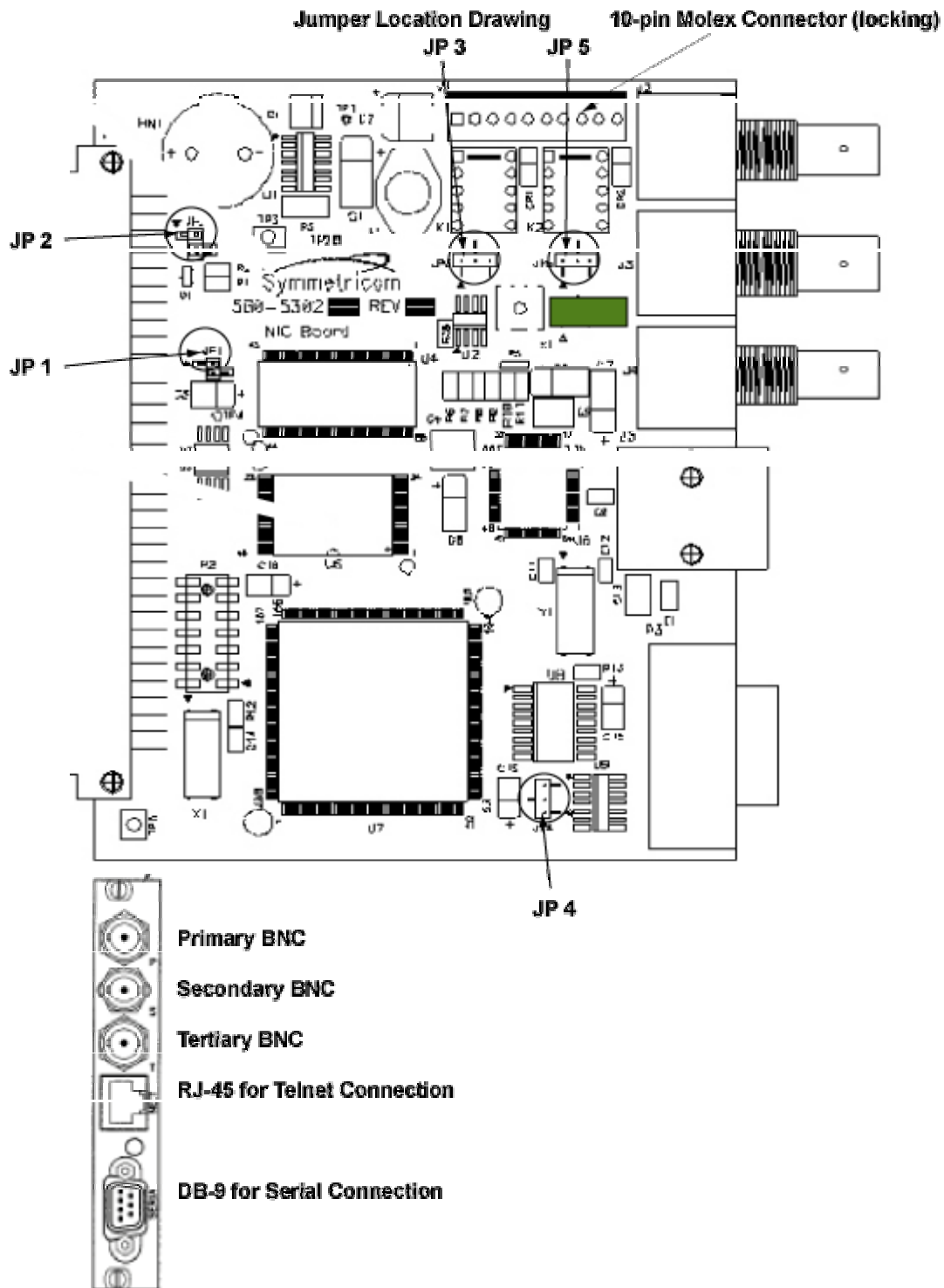


This three-pin jumper switches the Serial port's receive signal from RS-232 to RS-422. If the user desires RS-232 Serial port communication, set JP4 1-2. If RS-422 Serial port communication is desired set JP4 2-3. The factory default is 1-2 (RS-232).

2.1.1.5. JP5 (only when Alarm Relay Option is installed)



This three-pin jumper switches the OUT1 and MAJORALARM signals from the 560-5301 Fault Monitor/CPU for NIC Alarm Relay control. JP5 1-2 = OUT1 control. JP5 2-3 = MAJORALARM control. The factory default is 1-2 (OUT1 relay control). OUT1 = Composite Fault Active since Last Clear.



2.1.2. BASIC QUICK START INSTRUCTIONS

The following setup procedure assumes that the NIC card has been configured for RS-232 operation. Connect an RS-232 terminal (or a computer serial port/terminal program) to the DB-9 Serial port. A null modem adapter is required between the NIC card and the RS-232 terminal. Set the RS-232 terminal for 9600 baud, 8 data bits, No parity, 1 stop bit. Use the RS-232 terminal to set the Ethernet port addresses.

Caution: The NET port should have its address configuration parameters set before the Ethernet cable is connected.

Once the card is configured, the NIC card will reset and use the new settings. The Ethernet cable may now be connected. The NET port should now respond to PING at the configured address. If it does not, check the connection to the network and all network configuration parameters.

2.1.3. TELNET ACCESS

The NIC card connects to the 560-5301 Fault Monitor/CPU card, and provides both serial and NET port interfaces. The main feature of the NIC card is the ability to perform 56K system monitor and control functions from a remote location, using the Internet. The NIC card provides SNMP and HTML interfaces as well as the serial and Telnet command line interface. SNMP, MIB, DHCP, and HTML are NOT covered in this manual.

Refer to the 56000 User manual (Chapter 7) for a description of the SNMP and HTML interfaces and their user names and passwords.

The protocol used for command line network access to the NIC card is Telnet. Telnet is a widely available ASCII character-based interface. Telnet is a session-based terminal/remote host protocol developed for the Internet. Telnet is available on most Windows and UNIX based computer systems. Telnet operates just like Procomm or any other terminal emulation program where you enter 560-5301 Fault Monitor commands, and get responses. With the exception of automatic reporting on and off (ARON, AROFF) commands, the NIC card provides transparent access to the 'host' 560-5301 Fault Monitor/CPU card when using Telnet. The Telnet interface includes special commands that are used for NIC control. Telnet can only be used when the serial port is inactive. If a user accesses the serial port while a Telnet session is active, Telnet will receive the following message from the NIC card:

NOTICE: UTILITY MONITOR SESSION HAS TAKEN PRIORITY FROM THIS TELNET SESSION!

If a Telnet user continues to access the NIC while the serial port is active; Telnet will receive the following message from the NIC card:

NOTICE: CANNOT RESPOND TO COMMAND BECAUSE UTILITY PORT SESSION HAS PRIORITY!

The Telnet user must log off and back on to restore full control of the Telnet interface (assuming the serial port is inactive).

2.1.3.1. STARTING TELNET

To use Telnet, use Windows Explorer to find the file named Telnet.exe and then launch the program. This will cause Telnet to open a window on the desktop.

2.1.3.2. MAKING A TELNET CONNECTION

At the top of the Telnet window is a pulldown label named 'Connect'. Click on this label, then click on 'Remote System'. This will open a dialog box labeled 'Connect'.

2.1.3.3. CONNECT DIALOG BOX

The top window is labeled 'Host Name'. Enter the IP Address of the NIC card. The middle window is labeled 'Port'. The default value in the window is 'Telnet'. This value is fine; no change is needed. The bottom window is labeled 'Term

Type'. The window has the default set to 'VT100'. No change is needed. Click on the 'Connect' button at the bottom of the dialog box, which initiates a connection to the NIC card. NOTE: If an hourglass shows up instead of the following 'login' prompt, the connection attempt has failed. When a NIC connection is made, the following greeting is sent:

```
WELCOME TO SYMMETRICOM NETWORK INTERFACE
USER NAME:
```

The User name may be either '**operator**' or 'guest' (lower case!).
The NIC will prompt for a password:

```
PASSWORD: *****
```

The factory default password for the 'operator' login is '**janus**'. The factory default password for the 'guest' login is 'truetime' (all lower case).

After the login and password are approved, Telnet will display the following (example):

```
NETWORK INTERFACE 182-9030 (c) 1998 - 2003 SYMMETRICOM
ALL RIGHTS RESERVED
LOGIN SUCCESSFUL!
```

```
>
```

2.1.3.4. ENDING TELNET

A Telnet session may be terminated by closing Telnet using the dialog box Disconnect or by typing 'logout', 'logoff' or 'quit'. The following message is sent after the 'logout' command:

```
GOODBYE.
```

The 'connection to the host lost' dialog box will also appear.

The NIC timeout feature will automatically terminate a Telnet session. When no NET port activity is detected for 15 minutes, the NIC disconnects from Telnet. The following message is sent from the NIC after a 15-minute timeout:

```
NOTICE: TELNET SESSION ABORTED BECAUSE OF LACK OF ACTIVITY.
GOODBYE.
```

2.1.4. SERIAL ACCESS

Serial port command line interface uses the DB-9 connector. The NIC card's DB-9 is referred to as the serial port and is also referred to as the Utility Port and Utility Monitor Port in NIC text strings. The NIC card's serial interface provides transparent access to the command line functions of the 'host' 560-5301 Fault Monitor/CPU card. All 560-5301 serial commands are supported as well as special commands that are used for NIC control. A computer using any terminal emulation program such as Procomm or HyperTerminal may access the serial port. Note that a null modem connection is required.

2.1.4.1. HYPERTERMINAL

To use HyperTerminal, go through the dialog box sequence described in the following sections.

Starting HyperTerminal

Start => Programs => Accessories => HyperTerminal => HyperTerminal

This will cause HyperTerminal to open a dialog box labeled 'Connection Description'

2.1.4.2. CONNECTION DESCRIPTION DIALOG BOX

The cursor will be in a window labeled 'Name'. HyperTerminal will store this name for future uses of this particular connection. Enter the name you would like to use for this connection. Any character string can be entered.

There is another window in the dialog box. This window is labeled 'Icon'. You can leave this window alone. The next time you launch HyperTerminal from the START box you will have the option of launching the session you have just created. The session will be visible in the pulldown that HyperTerminal displays.

2.1.4.3. 'CONNECT TO' DIALOG BOX

HyperTerminal now opens a dialog box labeled 'Connect To'. If you need to change from Com1, do so. Otherwise, click on 'OK'. This will take you to a dialog box labeled 'Port Settings'.

2.1.4.4 'PORT SETTINGS' DIALOG BOX

There are several windows in this dialog box. Most of them must be altered. Work your way through them, from top to bottom. The required port settings are as follows:

Bits per second	9600
Data bits	8
Parity	<u>N</u> one
Stop Bits	1
Flow control	none

Click 'OK' and a connection will be made through the serial port to the NIC card. A HyperTerminal window will open.

2.1.5. SERIAL PORT PRIORITY

The serial port has priority over remote Telnet access. If the serial port is used when a Telnet session is in progress, the Telnet session is suspended. Serial port use must end before full Telnet access is possible.

2.1.6. SESSION TIMERS

Both the Serial and NET ports have independent 'session timers' that operate as watchdog timers. A serial or Telnet session timer starts whenever data is passed through the interface. If no data is passed through the interface for 15 consecutive minutes, the serial or NET port watchdog timer will terminate the session. Note that the timeout terminated Telnet session results in disconnection to the remote host. A new Telnet connection can be made immediately.

2.1.7. SERIAL OR TELNET FAULT MONITOR/CPU COMMANDS

The NIC card is ready for commands after the NIC boots its operating program. Refer to the 560-5301 manual for details on the following Fault Monitor/CPU commands. Note that these commands may be entered in either upper or lower case.

---- Reference Commands ----

REF	Automatic REF selection based on PST fault status inputs.
REFA!	Enable REFA only, disable REFB and REFC.
REFB!	Enable REFB only, disable REFA and REFC.
REFC!	Enable REFC only, disable REFA and REFB.
REFA=x	Indicate Reference A is x MHz, x = 1, 5 or 10.
REFB=x	Indicate Reference B is x MHz, x = 1, 5 or 10.
REFC=x	Indicate Reference C is x MHz, x = 1, 5 or 10.
PSRC=x	P external fault input level (x=H,L,D,O).
PSRC?	Request P external fault input level setting.
SSRC=x	S external fault input level (x=H,L,D,O).
SSRC?	Request S external fault input level setting.
TSRC=x	T external fault input level (x=H,L,D,O).
TSRC?	Request T external fault input level setting.

---- Timing Commands ----

PRI	Switch to primary inputs if available.
PRI!	Switch to primary inputs regardless of faults.
SEC	Switch to secondary inputs if available.
SEC!	Switch to secondary inputs regardless of faults.
TPRI=x	Map timing card P input to ext fault status input (x=P,S,T,N).
TPRI?	Request timing card P input to ext fault status input mapping.
TSEC=x	Map timing card S input to ext fault status input (x=P,S,T,N).
TSEC?	Request timing card S input to ext fault status input mapping.

---- Configuration Commands ----

C##?	Request configuration on front and rear cards in slot ##.
C## [data]	Configure front card in slot ##. Refer to manual for [data].
C##=xxxx	Enter front card id in slot ##.
CR##=xxxx	Enter rear card id in slot ##.

DEFLT Restore default parameters.
SITE=xx Enter site number 0-99.
SITE? Request site number.

---- Alarm Commands ----

BOFF Turn off / disable audible alarm.
BON Turn on / enable audible alarm.
CL Clear fault latches (Firmware/Relays).
Latch Enables faults to be latched (use CL to clear latch)
Nolatch Disables latch alarms (enables SNMP traps upon fault changes)
Q Quiet the audible alarm for the current alarm only.

---- Report Commands ----

AROFF Turn off automatic fault reports (serial only).
ARON Turn on automatic fault reports (serial only).
H Display HELP messages.
M Switch to machine mode.
PR## Turn on periodic reports at ## minute intervals.
PROFF Turn off periodic reports.
R Request a report.
V Switch to Verbose mode.
VER? Request current software & FPGA versions.

2.1.8. SERIAL OR TELNET NIC CARD COMMANDS

The NIC card is ready for commands after the NIC boots its operating program. All NIC specific commands start with F100 followed by parameters. The parameters specify which NIC command is to be executed. The parameters may also provide data to the command. Note that the following commands may be entered in either upper or lower case.

COMMAND	FUNCTION	PARAMETERS
F100 EA	NET Port Ethernet Address	00-A0-69-##-##-##
F100 IC	NIC Configuration Request	None
F100 IP	NET Port IP Address	###.###.###.###
F100 G	NET Port Gateway	###.###.###.###
F100 P	Password This command does affect the user name and Password in Telnet but does not affect the same when using HTML. The HTML passwords and user names are changed using HTML pages and are different than those names used in Telnet.	Xxxxxxxxxx
F100 R	Reset to Default This command resets the card and has no impact on the passwords or user names.	None

F100 SM	NET Port Subnet Mask	###.###.###.###
F100 ST	Network Self test results Request	None
F100 VER	Version Request	None

2.1.8.1. FUNCTION F100 EA / IP / SM / G / IC = NET PORT CONFIGURATION ENTRY/REQUEST

Use serial or Telnet function F100 IC to obtain information about the NIC card's configuration. Note that when a NET port configuration parameter is changed, the unit will reboot after the command is finished.

F100 EA = Ethernet Address (factory set)

The Ethernet address is a six-byte, hexadecimal value specific to each NIC card. The first three bytes are registered to Symmetricom; the last three bytes are the hex value of the unit's unique number. The Ethernet address of the NIC card is a fixed address that has been set at the factory. To request the Ethernet address of the NIC card, send the string:

```
F100 EA<CR>
```

The unit responds with:

```
F100 EA:00-A0-69-xx-xx-xx<CR><LF>
```

Where 'xx-xx-xx' are the six hex digits of the unit's unique address. Attempts to set this field will be rejected with a syntax error message.

F100 IP = IP Address

The IP address can be queried at any time. To obtain the IP address of the NIC card, send the string:

```
F100 IP<CR>
```

The unit responds with:

```
F100 IP:nnn.nnn.nnn.nnn<CR><LF>
```

Where 'nnn.nnn.nnn.nnn' is the dotted decimal address notation.

To set the IP address and restart the NIC card, send a string of the form:

```
F100 IP:nnn.nnn.nnn.nnn<CR>
```

Example: F100 IP:192.168.47.218<CR>

Note: Changing this parameter will cause a software reset of the NIC card.

F100 SM = Subnet Mask

The subnet mask can be queried at any time. To return the subnet mask of the NIC card, send the string:

```
F100 SM<CR>
```

The unit responds with:

F100 SM:nnn.nnn.nnn.nnn<CR><LF>

To set the subnet mask and restart the NIC card, send the string:

F100 SM:nnn.nnn.nnn.nnn<CR>

Example: F100 SM:255.255.255.0<CR>

Note: Changing this parameter will cause a software reset of the NIC card.

F100 G = Gateway

The Default Gateway can be queried at any time. To obtain the Default Gateway of the NIC card, send the string:

F100 G<CR>

The unit responds with:

F100 G:nnn.nnn.nnn.nnn<CR><LF>

To set the Default Gateway and restart the NIC card, send the string:

F100 G:nnn.nnn.nnn.nnn<CR>

Example: F100 G:192.168.47.1<CR>

Note: Changing this parameter will cause a software reset of the NIC card.

F100 IC = Network Configuration Request

To review the entire network configuration of the NIC card, send the string:

F100<space>IC<CR>

The unit responds with (example):

F100 IP:123.456.789.123 SM:123.456.789.123
G: 123.456.789.123 <CR><LF>

This response indicates the specific IP address, Subnet Mask, and Default Gateway of the NIC card. Note that leading zeros within fields of the dotted decimal addresses are omitted from the IP address, Subnet Mask, and Default Gateway.

To set all settable network parameters and reset the NIC card, send the string (example):

F100 IP:123.456.789.123 SM:123.456.789.123
G: 123.456.789.123 <CR>

This example provides the NIC card with an IP address, Subnet Mask, and Default Gateway. Note that leading zeros may be omitted when entering IP address, Subnet Mask, and Default Gateway. Any field may be omitted and order is not significant. Blanks are allowed on either side of a colon. Any legal command set containing one of the three network parameters will cause a reboot of the NIC card.

2.1.8.2. FUNCTION F100 P = CHANGE USER PASSWORD

The User Password is only used when initiating a Telnet Session.

The password may be changed from either the Telnet or the serial port. The user may change the password from the Telnet interface only after logging in with the old password. It is not necessary to know the old password in order to enter a new password when using the local serial interface. If a user forgets the password, all they have to do is use the serial port to define a new one. Maximum password size is ten characters.

To change the password, send the string:

```
F100<space>P<cr>
```

Where:

F	=	ASCII character F
100	=	NIC card function number
<space>	=	ASCII space character
P	=	specify Password command
<cr>	=	ASCII Carriage Return

Setting guest login password example:

```
>f100 p
ENTER NEW USER PASSWORD: *****
CONFIRM NEW USER PASSWORD: *****
OK
>
```

The new password will be used for the next Telnet login. The new password and the confirming password must match or the NIC will respond with the following:

```
ERROR: PASSWORDS DO NOT MATCH. NEW PASSWORD REJECTED!
```

The old password will be used for the next Telnet login.

2.1.8.3. FUNCTION F100 VER = FIRMWARE REQUEST

This command queries the NIC for firmware and FPGA information. The NIC's firmware is comprised of three files, known respectively as bootloader, software and file system. Other relevant data, including the NIC card's serial number, is reported by this command. This data cannot be changed -- it may only be queried.

To query the NIC for firmware information send:

```
F100<space>ver<cr>
```

Example Response:

```
F100 VER
BOOTLOADER 182-9029
SOFTWARE 182-9030
```


FILE SYSTEM 182-9031V1.68.1.10
NVRAM VER 2
PROJ REV # 1.68.1.10
FPGA # 184-2015V14200
SERIAL # 0003XXXX

2.1.8.4. FUNCTION F100 BASET = 10/100BASET CONTROL

With the BASET command, the unit can be forced to 10BaseT only, or allow it to auto-negotiate between 10BaseT and 100BaseT. The current BASET setting can be queried with this command. If the BASET command is used to set the BASET value, the NIC card will reboot.

To query the current BaseT speed, send:

```
F100<space>BASET<cr>
```

To set automatic connection speed, send:

```
F100<space>BASET<space>auto<cr>
```

To force 10BaseT maximum connection speed, send:

```
F100<space>BASET<space>10<cr>
```

Where:

F	=	ASCII character F
100	=	NIC card function number
<space>	=	ASCII space character
BASET	=	specify BaseT command
<space>	=	ASCII space character
auto	=	sets maximum BaseT speed to 100
10	=	sets maximum BaseT speed to 10
<cr>	=	ASCII Carriage Return

2.1.8.5. FUNCTION F100 ST = SELF TEST STATUS

The status of the power-up tests can be queried with the ST command. The return result contains the PASS/FAIL status of the flash memory checksum test, ram test, serial port test and version check. To query the self-test status, send:

```
F100<space>ST<cr>
```

Where:

F	=	ASCII character F
100	=	NIC card function number
<space>	=	ASCII space character
ST	=	specify ST command
<cr>	=	ASCII Carriage Return

The returned result is in the following format:

```
F100<sp>ST<sp>FLASH/CRC:<sp><STATUS>,<sp>RAM<sp>:  
<sp><STATUS>,<sp>SERIAL:<sp><STATUS>,<sp>NVRAM<sp>
```

VER:<sp><STATUS><cr><lf>

Where:

F	=	ASCII character F
100	=	NIC card function number
<space>	=	ASCII space character
ST	=	ST command
FLASH/CRC:	=	flash checksum result
RAM:	=	ram test result
SERIAL:	=	serial port test result
NVRAM VER:	=	this test compares the version of the code against the version recorded in the non-volatile memory.
<STATUS>	=	is either ASCII PASS or FAIL
,	=	ASCII comma
:	=	ASCII colon
<cr>	=	ASCII Carriage Return
<lf>	=	ASCII Line Feed

Example:

F100 ST FLASH/CRC: PASS, RAM: PASS, SERIAL: PASS, NVRAM VER: PASS

2.1.8.6. LOGIN/LOGOUT COMMAND

There are two available Telnet logins, either 'operator' or 'guest'. Note that no 'Login' is necessary to access the serial interface.

As shipped, the 'operator' login on Telnet has a default password of 'janus' (lower case). In order to maintain security, the operator password should be changed at time of installation. Operator may perform all serial functions with the exception of changing the guest password.

As shipped, the guest login on Telnet has a default password of 'truetime' (lower case). Guest may perform all of the defined serial functions, including changing the guest password. In order to maintain security, the guest password should be changed at time of installation. Guest may perform all serial functions with the exception of changing the operator password.

2.1.8.7 Upgrading System Software

The 56K NIC software is comprised of three files, known respectively as 'bootloader' (.bt), 'software' (.bin), and file system (.fs). This section explains how to completely upgrade the NIC firmware. Updates are performed using the F100 BH, F100 BUB, F100 BU, and F100 BF commands.

Warning: Consideration must be given to the software and the hardware version numbers of the 56K NIC and it's optional components. Consult with Symmetricom's customer service department before performing upgrades.

The procedure for upgrading software is as follows:

1. Setting up the NIC, an FTP server, and a Terminal.

2. Obtain the current system software files from Symmetricom, Inc. (E.g., 182-9029.bt (.bt is the bootloader extension), 182-9030.bin (.bin is the application software extension), 182-9031.fs (.fs is the file system extension).

3. Place the system software files on an FTP server. (The FTP server should be set up to allow an anonymous log in from the NIC without a password. We recommend using an FTP server installed on your local machine, rather than a public FTP server. Connect the NIC to a network port that provides access to the FTP server.

4. Using a terminal or terminal emulation program, open a command line session to the NIC through the serial port or network port (Telnet).

Installing the new bootloader, software, and file system:

1. Using the command line, install the new 'bootloader' (filename.bt) by entering the following:

```
F100 bh <ftp_server_ip_address>space<ftp_relative_path/><filename.bt>
```

where:

F100 bh (burn host command) is used to select the FTP server host.

The FTP server is on your local PC, **ftp_server_ip_address** is the IP address of your PC.

ftp_relative_path is a directory *inside* the anonymous user's home directory on the FTP server. If no directory is inside the anonymous user's home directory (i.e., if the upgrade files are sitting in anonymous user's home directory), drop the **ftp_relative_path/** from the command line. Use of UNIX style forward slashes '/' in the path is allowed. Do not describe the drive (for example, 'C:') in the path.

For example, if c:/ftpworkfiles is the anonymous user's home directory, and the upgrade files are in c:/ftpworkfiles/56k/, you would enter the command as follows:

```
F100 bh 10.1.3.233 56k/filename.bt
```

On the other hand, if c:/ftpworkfiles is the anonymous user's home directory, and the upgrade files are in c:/ftpworkfiles, you would drop the **ftp_relative_path/** and enter the command as follows:

```
F100 bh 10.1.3.233 filename.bt
```

The 56K responds:

```
BURN HOST IS READY!!!
```

Then 'burn' the bootloader to the 56k's flash memory by entering:

```
F100 bub
```

F100 bub is the 'burn boot' command that will burn the software upgrade bootloader into flash memory.

The 56K NIC responds:

OK<CR><LF>

BURNING FILE filename.bt WITH SIZE 452164 TO PARTITION:0 SECTOR:0

SEC: 0 RE: 0

SEC: 1 RE: 0

SEC: 2 RE: 0

SEC: 3 RE: 0

SEC: 4 RE: 0

SEC: 5 RE: 0

SEC: 6 RE: 0

FLASH SUCCESSFULLY PROGRAMMED CRC32 = 0x9EFBE60A

Do the same for the 'software' (.bin) file:

F100 bh <ftp_server_ip_address> <ftp_relative_path_from_root/><filename.bin>

For example:

F100 bh 10.1.3.233 56K/currentbuild/filename.bin

The NIC responds:

BURN HOST IS READY!!!

Then enter:

F100 bu

Where F100 bu is the 'burn' application software command.

The NIC responds:

OK

BURNING FILE filename.bin WITH SIZE 803016 TO PARTITION:1 SECTOR:10

SEC: 10 RE: 0

SEC: 11 RE: 0

SEC: 12 RE: 0

SEC: 13 RE: 0

SEC: 14 RE: 0

SEC: 15 RE: 0

SEC: 16 RE: 0

SEC: 17 RE: 0

SEC: 18 RE: 0

SEC: 19 RE: 0

SEC: 20 RE: 0

SEC: 21 RE: 0

SEC: 22 RE: 0

FLASH SUCCESSFULLY PROGRAMMED CRC32 = 0x2D9A260A

Do the same for the 'file system' (.fs) file:

F100 bh <ftp_server_ip_address> <ftp_relative_path_from_root/><filename.fs>

For example:

F100 bh 10.1.3.233 56K/currentbuild/filename.fs

The NIC responds:

BURN HOST IS READY

Then enter:

F100 bf

Where F100 bf is the 'burn file system' command

The NIC responds:

OK

BURNING FILE filename.fs WITH SIZE 524288

SEC: 94

SEC: 95

SEC: 96

SEC: 97

SEC: 98

SEC: 99

SEC: 100

SEC: 101

SEC: 102

End of procedure. The NIC now has the upgrade system software stored in flash memory. The new code is executed after the NIC is re-booted.

F100 BUFM

Use the F100 BUFM (BUrn Fault Monitor) command when upgrading the 560-5301 Fault Monitor software. This NIC command only stores the Fault Monitor program in the NIC's flash, ready to be transferred to the Fault Monitor with the F100 LDFM command.

To write the file to the NIC flash, send the F100 BH command with the FTP host, file path and name, and then enter:

F100 BUFM<Enter>

NIC responds:

BURNING FILE 56K.SX TO PARTITION: 3, SECTOR:10

FILE: 121666 BYTES, PARTITION: 262132 BYTES (46% used)

SEC: 10 RE: 0

SEC: 11 RE: 0

FLASH SUCCESSFULLY PROGRAMMED CRC32 = 0x0

>

F100 LDFM

Use the F100 LDFM (LoaD Fault Monitor) command to transfer the new Fault Monitor program, stored in the NIC's flash, to the Fault Monitor card.

Note that once an image has been burned into the NIC's flash with the F100 BUFM command, this command can be used at any time to load the program into the flash memory of the attached Fault Monitor. There is no need to use F100 BH or F100 BUFM unless it is desired to change to a new version of the Fault Monitor program.

To write the file to the Fault Monitor flash, enter:

F100 LDFM<Enter>

NIC responds:

Preparing to load program into Fault Monitor...

Erasing present Fault Monitor program...

Erased, loading new program...

10 S records programmed

20 S records programmed

30 S records programmed

40 S records programmed

50 S records programmed

1550 S records programmed

1560 S records programmed

1570 S records programmed

1577 S records programmed

Fault Monitor successfully programmed. Restarting it...

Fault Monitor running, waiting for it to init...

Fault Monitor initialized. Program down load process done

Fault Monitor version: 560-3175 1.22 184-054

>

LATCH/NOLATCH COMMANDS

In Latch Mode, the Faults are cleared by using the "CL" command.

In No Latch Mode, the Faults are automatically cleared when the fault info has been read and the fault condition has gone away.

A fault indication appears when:

- 1) A fault has occurred and is still alarming.
- 2) A fault has occurred and gone away, but we have not read the fault status yet.

Once we read the fault status, the fault status can go to a non-fault condition when the actual fault becomes OK.

Note: Any change in the fault info (OK or Fault) will cause the Fault Monitor Card to signal the NIC card.

2.1.8. 560-5301 FAULT MONITOR/CPU ERROR MESSAGES

ERROR 01: VALUE OUT OF RANGE

User has entered a valid 560-5301 command, with an invalid parameter value.

ERROR 02: SYNTAX

User has entered a valid 560-5301 command with a minor syntax error.

ERROR 05: NO SUCH FUNCTION

User has entered an invalid 560-5301 command.

2.1.9. NIC ERROR MESSAGES

ERROR: ILLEGAL COMMAND

User has entered an invalid NIC command.

ERROR: UNDEFINED COMMAND

User has entered an invalid NIC command.

ERROR: COMMAND IS NOT SUPPORTED

User has attempted to use a command that is not supported.

ERROR: ACCESS DENIED

An attempt has been made to use a NIC command that is not user-accessible.

ERROR: LOGIN REFUSED

Attempt to login from Telnet with an invalid user name. The user name must be either 'operator' or 'guest'.

2.1.10. NIC INFORMATIONAL MESSAGES

These messages inform the user of NIC events.

GOODBYE

NIC card has just terminated a Telnet session.

RESETTING THE UNIT

A command has just been executed that requires a soft restart of the NIC card. The restart happens immediately after this message is sent

NOTICE: A NEW TELNET SESSION HAS BEEN STARTED ON THE INTERNET PORT.

Informs Serial port user that someone has logged onto Telnet on the NET port.

NOTICE: CANNOT RESPOND TO COMMAND BECAUSE UTILITY PORT SESSION HAS PRIORITY.

The NET port has tried to issue a command but was prevented from doing so because the serial port is active. The user on the NET port cannot execute a command until activity on the serial port ceases.

NOTICE: RESOURCE USAGE CONFLICT. TRY AGAIN LATER.

Simultaneous attempts to change the user password are being attempted from the serial and the NET port.

NOTICE: THERE IS ALREADY A TELNET SESSION ON THE INTERNET PORT.

Message to the Serial port user when the NET port was already active.

NOTICE: TELNET PORT INACTIVITY TIMEOUT

Sent to the NET port to inform that the Telnet session watchdog has expired. The Telnet session will be terminated immediately after this message is displayed.

NOTICE: TELNET SESSION TERMINATED BY TIMEOUT.

Sent to serial port, if it is active, to inform the serial port user that the Telnet session has timed out.

NOTICE: UTILITY MONITOR SESSION HAS TAKEN PRIORITY FROM THIS TELNET SESSION.

Sent to the NET port user to inform him that he can no longer enter commands because of activity on the serial port. The serial port has priority over the NET port. The Telnet user must log off and back on to regain control of the 56K.

NOTICE: UTILITY PORT INACTIVITY TIMEOUT

Sent to the Serial port after its timer has expired from lack of activity.

NOTICE: YOU HAVE TAKEN CONTROL AWAY FROM THE TELNET SESSION.

Sent to the serial port to inform the user that a Telnet session was in progress when the serial port user regained access.

SORRY! MAXIMUM NUMBER OF CONCURRENT TELNET SESSIONS EXCEEDED.

Another Telnet user is currently logged in. Only one Telnet session at a time is allowed.

OK

A command has been accepted and processed as specified.

WELCOME TO SYMMETRICOM NETWORK INTERFACE!

USER NAME: guest

PASSWORD: *****

NETWORK INTERFACE 182-9030 (c) 1998 - 2003 SYMMETRICOM

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LOGIN SUCCESSFUL!

A NET port user has just successfully logged in by sending in the correct login name and password.

ENTER NEW USER PASSWORD:

User has entered change password command (F100 p). This is the first prompt for the new password. User must enter a new password. Factory defaults: 'operator' = 'janus', 'guest' = 'truetime'.

CONFIRM NEW USER PASSWORD:

This messages prompts for the new password to be entered again for confirmation.

ERROR: PASSWORDS DO NOT MATCH. NEW PASSWORD REJECTED.

The re-entered new password does NOT match the original new password.