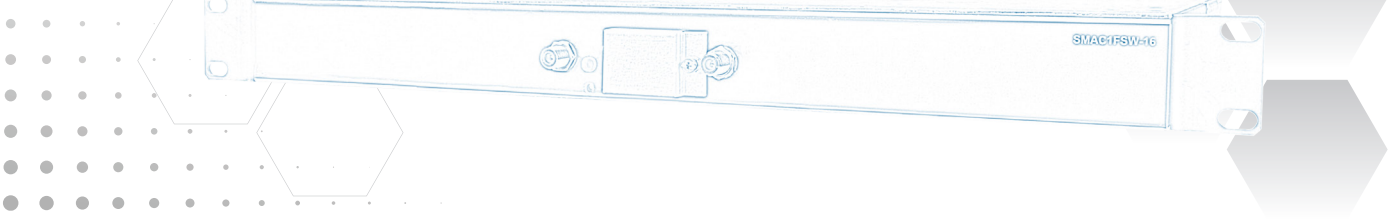
SMAC℠ by ATX

Status Monitoring
And Control Solutions

(HMS Compliant, SNMP Based)

SMAC℠ Status Monitoring and Control Quality of Service (QoS) Diplex Switch Test Gear

Installation & Operation Manual



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PRODUCT DESCRIPTION

1. Product Description

1.1. 1RU Chassis

The SMAC1FSW-16 is a 1RU integrated chassis that supports a switch matrix style sampling of up to 16 forward and return segments of an RF headend. This allows for Quality of Service diagnostic functions using a cable modem and automated test program to use Telnet commands to control the device.

Figure #1: SMAC1FSW-16 (front view)

Figure #2: SMAC1FSW-16 (rear view)

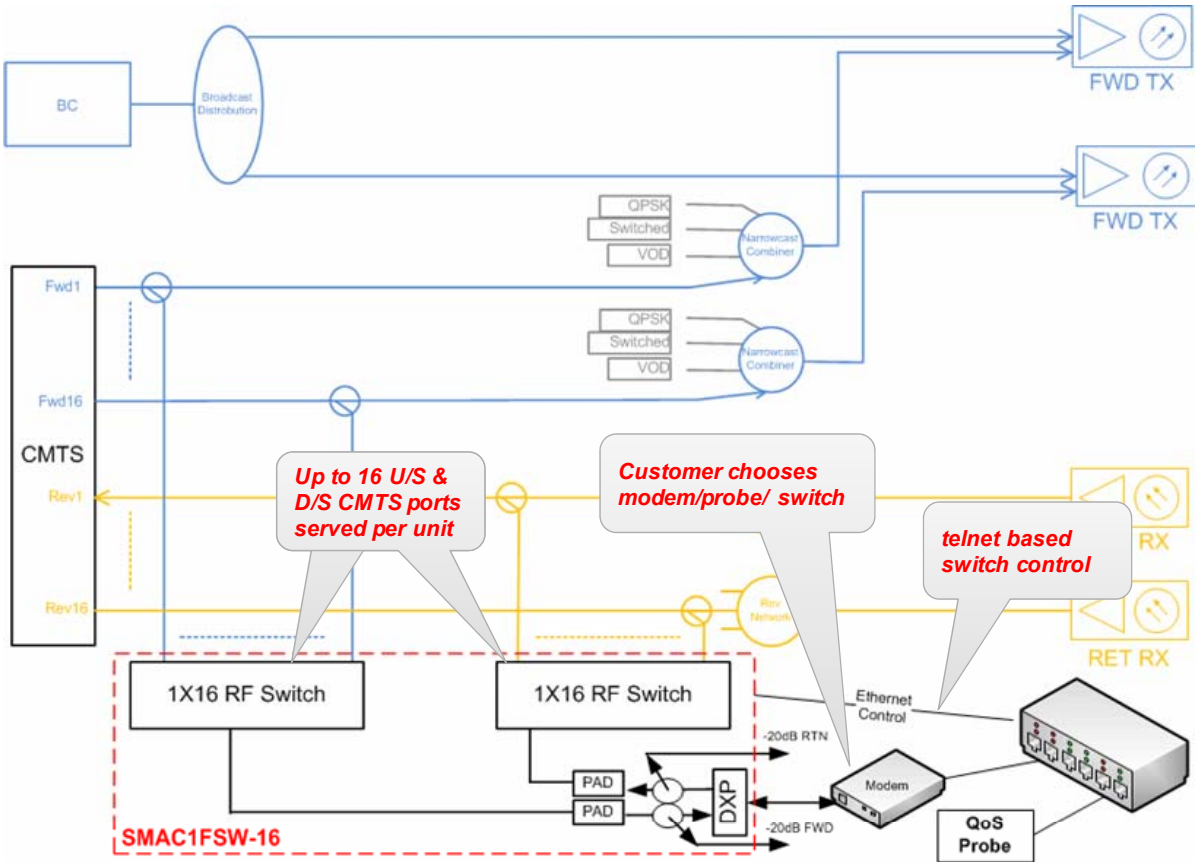
1.2. RF Input/Output

- One Common RF port (5-1002MHz) intended to be connected to cable modem (rear)
- 16 Downstream RF Inputs (54-1002MHz) (rear)
- 16 Upstream RF Outputs (5-42 MHz) (rear)
- One Downstream RF test point, 20dB below common port output (front)
- One Upstream RF test point, 20dB below common port input (front)

1.3. Other Input/Output

- AC powered with a standard IEC connector style (rear)
- One standard RJ45 Ethernet port for Telnet interface (rear)
- Status LED, blinks to indicate software running (front)
- Software RESET pushbutton switch (front)
- 2 JXP plug-in attenuator pads, shipped with 0dB installed (front)
  - up to 20dB available as MN*PAD, * dB value 0..20

1.4. Functional Schematic



1.5. Technical Specifications

SPECIFICATIONS	
ELECTRICAL	
INPUT VOLTAGE	100-240 VAC
INPUT FUSE RATING	1A, 250V
FREQUENCY	50/60 Hz
INPUT POWER (Max)	4W
MECHANICAL	
OPERATING TEMPERATURE	0°C to +50°C (+32°F to +122°F)
HUMIDITY	5-95% (without condensation)
DIMENSIONS	1RU, Rack Mount: 1.75"H x 19.0"W x 9.0"D (4.45H x 48.26W x 22.86D cm)
WEIGHT	4.6 lbs (2.1 kg)
COMMUNICATIONS INTERFACE	10/100 Base-T Telnet

Table #1: Chassis Technical Specifications

SPECIFICATIONS			SMAC1FSW-16
MEASUREMENT		FREQUENCY	QA (dB)
INSERTION LOSS ANY DS PORT TO COMMON		5-42 MHz 54-1002 MHz	> 70 19 +/- 1
INSERTION LOSS ANY US PORT TO COMMON		5-42 MHz 54-1002 MHz	19 +/- 1 > 40
US TEST POINT RELATIVE TO COMMON (Input)		5-42 MHz	20 +/- 1
DS TEST POINT		54-1002 MHz	20 +/- 1
SWITCH OFF (Isolation)	US TO COMMON	5-200 MHz 200-1002 MHz	> 70 > 60
	DS TO COMMON	5-1002 MHZ	> 70
	US TO DS	5-1002 MHz	> 60
	US TO US OR DS TO DS	5-1002 MHz	> 50
RETURN LOSS, ANY PORT		5-1002 MHz	> 16
RETURN LOSS, DS INPUT, OUT OF BAND		5-15 MHz	> 14

Table #2: RF Specifications

INSTALLATION

2. Installation

The chassis comes pre-assembled and ready to mount to any existing 19” rack cabinet hub system using 10/32” rack screws.

NOTE: This equipment is intended for installation in a **RESTRICTED ACCESS LOCATION** only.

NOTE: Not for use in a computer room as defined in the Standard for Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

2.1. Rack Mounting Precautions

a) **Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (50ºC) specified by the manufacturer.

b) **Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

c) **Mechanical Loading** - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

d) **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

e) **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).”

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HARDWARE NETWORK SET-UP

3. Hardware Network Set-up

The chassis can be easily connected to an existing network through the use of a patch cable connected between the network port on the rear of the chassis and any switch or router. For a connection directly to a PC or laptop, use a crossover cable. This product has been verified to work on Windows XP/2000 and Linux operating systems.

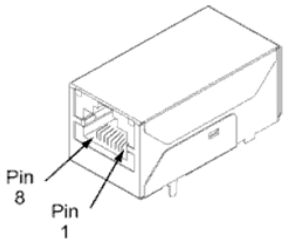
3.1. Ethernet Port

The RJ45 Ethernet port visible at the rear of the chassis is actually the DC-ME-01T-C embedded device server, manufactured by Digi International and loaded with custom ATX firmware. The following figures and text were taken directly from the "Digi Connect ME & Digi Connect Wi-ME Hardware Reference". For more information, please go to www.digi.com.

The Ethernet connector is an 8-wire RJ-45 jack that meets the ISO 8877 requirements for 10/100BASE-T. See the following figure and table for pin orientation and pin assignments.

The yellow LED indicates whether a valid network connection is present. It should be solid. Otherwise, check the network cable or the piece of hardware that has been connected to the network cable (switch, router or PC's network card).

The green LED indicates network activity. It will be solid during any boot process (approx 2 min) and then blink if there is any network traffic. If it remains solid, this may be indicative of corrupt hardware – contact ATX Networks.



Ethernet Interface Pin Assignments							
Pin 1	**Pin 2**	**Pin 3**	**Pin 4**	**Pin 5**	**Pin 6**	**Pin 7**	**Pin 8**
TXD+	TXD-	RXD+	EPWR+	EPWR+	RXD-	EPWR-	EPWR-
Transmit Data +	Transmit Data -	Transmit Data +	Power from Switch +	Power from Switch +	Receive Data -	Power from Switch -	Power from Switch -

Table #3: Ethernet Interface Pin Assignments

LED	Pin Header EM	Integration Kit Digi Connect ME
Top Left (yellow)	5 (+) 7 (-)	Network link status: Off - No link has been detected. On - A link has been detected.
Top Right (green)	1 (+) 3 (-)	Serial port activity/Network activity: Off - The serial channel is idle. Blinking - Serial data is transmitted or received.

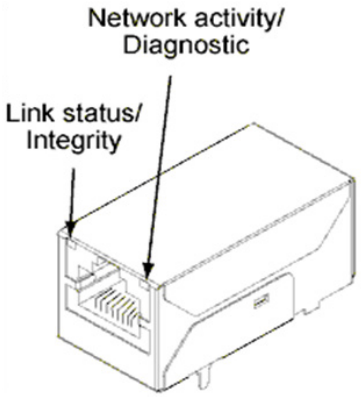


Table #4: Ethernet Interface LED Indicators

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STATUS MONITORING

4. Status Monitoring

4.1. Included Files

There are 3 files included with the initial release:

1. digi_sr.py – driver file used to control the message parsing
2. setShiftRegister.py – test script to manually set any port
3. net_config.py – Network setting configuration script

Also included is Python version 2.6 which is required to run the included scripts.

4.2. Network Settings

4.2.1. PC Set-up

The default network settings for the device are:

IP Address: 192.168.200.10
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.200.254

To communicate with the device, a network compatible PC needs to be setup on the same subnet. The following is an example setting:

IP Address: 192.168.200.11
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.200.254

4.2.2. Changing Network Settings

Open a windows command prompt window and ensure that it is pointing to the directory containing the included python script files. To change the device network settings, follow the below usage:

net_config.py –s DIGI_IP –I NEW_IP –m NET_MASK –g GATEWAY -d DNS

To change the device network interface port, use windows Telnet (user: root, Password: root). use the following usage (example using default IP, changing port to 9000 from the default 9878):

telnet 192.168.200.10
login: root
Password: root

#echo 9000 > /etc/config/port.cfg

4.3. Message Formats

A user will be able to control the Digi ConnectMe (and by extension) the two switch banks via a socket interface. The IP address and port number will be configurable using telnet on the standard port (23).

The default port number of the main application is 9878 and the default IP address of the Digi ConnectMe is 192.168.200.10

Command and response messages are formatted as follows:

- Messages are processed as variable length strings
- All messages are terminated with an ASCII carriage return and linefeed (\r\n)
- All messages start with an ASCII start of text (0x02)
- All messages return a confirmation (some with status information)
- Since the TCP protocol implements checksums, only basic error checking will be done at the received message level

Parameters contained in messages are formatted as follows:

- String values contain all printable characters except for comma as that is the parameter delimiting character
- Integer values (integer, long and unsigned integer) are represented as a string in any form that the C function sscanf would find acceptable.
- Parameters are separated by a comma.

On initial connection, the Digi ConnectMe sends either the following message: *connected*

4.4. Message Details

4.4.1. set Command

Used to set a bit of a shift register.

Command:

set:<shift register>:<bit to set>

Response (Digi ConnectMe sends this after the set is completed):

set:<shift register>:<status>

shift register: integer. The integer value of the shift register to set (1 or 2)

bit to set: integer. This is the 16 bit mask that will drive the shift register. 0x0000 to clear the register

status: integer. This is the 16 bit value that was last transferred to the shift register

4.4.2. status Command

Used to determine what the last setting of the shift register was. If status is requested on shift register 0, then the Digi ConnectMe will return the status of both shift registers.

Command:

status

Response:

status:<version>,<shift register 1>,<shift register 2>

version: string. This string is the version of the Digi ConnectMe firmware

shift register 1: integer. This is the 16 bit mask that will drive the shift register

shift register 2: integer. This is the 16 bit mask that will drive the shift register

4.4.3. reset Command

Requests that the Digi ConnectMe perform either a hard or soft reset. A hard reset amounts to rebooting the hardware component of the board. A soft reset simply resets the software API portion, and is therefore much faster.

Command:

reset:<level>

<level>: string. Must be either “hard” or “soft”.

Response:

reset:ok

After which point the connection will be dropped immediately as the reset takes place. The connection must be reestablished manually.

4.5. setShiftRegister Testing

This script is useful for manually setting any 1 port on each path to be active. The usage requires that a windows command prompt be open and pointing to the folder containing this script. Use the following usage for this script:

setShiftRegister.py –i DIGI_IP –r#(1 Downstream, 2 Upstream) –v# (port # 1-16)-pDIGI_PORT

The following is an example of setting first DS10 and then US5 to be active using a default network device:

setShiftRegister.py –i 192.168.200.10 –r 1 –v 10 –p 9878

setShiftRegister.py –i 192.168.200.10 –r 2 –v 5 –p 9878

MAINTENANCE & TROUBLESHOOTING

5. Maintenance & Troubleshooting

5.1. Front LED Not Blinking

It is normal for the round LED near the RESET switch to be solid ON or OFF during various states of system boot-up. If the chassis has been powered up for at least 2 minutes, then the red LED should be blinking to indicate the chassis software is running. If it is not, a reboot is necessary by either pressing RESET button or pulling AC power cord briefly.

5.2. No Response From Chassis Over Network

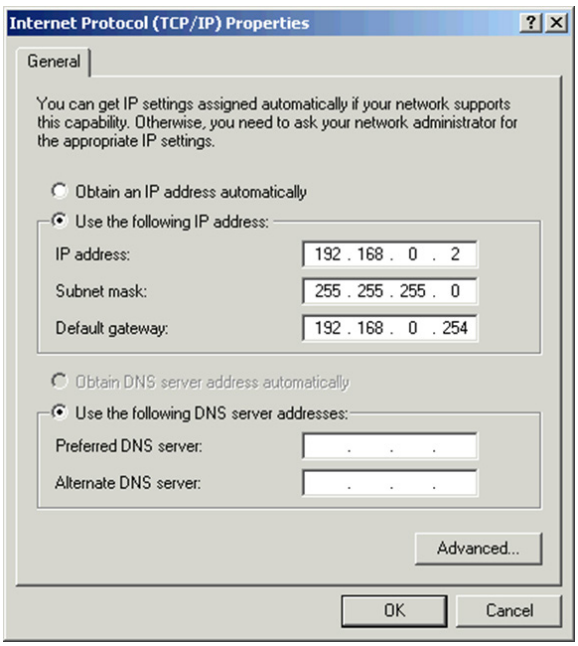
Typically, this is a 'subnet' issue. In order for any device to see another device on the same network, they must be on the same subnet. Consult your IT department for details of your network, but typically the subnet refers to the first three of the four octets in an IP address (eg. if the computers in your network are given IP addresses of 192.168.10.1 through 192.168.10.250, then the subnet is the 192.168.10 part).

Each chassis ships with a default IP of 192.168.200.10, so the PC connected to it must have an IP address of 192.168.200.x where x is not equal to 10. This is not generally the case, so it must be forced.

To modify the PC's IP in Windows, choose Start -> Settings -> Network Connections -> Local Area Connection -> Properties -> Internet Protocol (TCP/IP).

If the chassis IP is no longer at the default IP, modify the subnet portions of these settings (IP address and Default Gateway) to match.

If the chassis is still not visible, it is possible the IP address of the chassis has been forgotten (see Factory Reset section), the network connection is not good (see Ethernet Port section for LED diagnostics) or a network port is blocked or firewalled (check with your IT department).



5.3. Factory Reset

A factory reset will restore the chassis to the state which it left the ATX production facility.

5.3.1. Parameters That Will be Changed

IP address = 192.168.200.10

NetMask = 255.255.255.0

Gateway = 192.168.200.254

Passwords set to same text (but all lower case) as the login level. e.g. Operator password is operator.

All analogue and discrete alarm thresholds of modules will be reset to default values (except RF and optical switch data as mentioned in the Module Replacement section above).

Alarm log will be cleared.

5.3.2. Purpose

Common reasons for requiring a factory reset are:

a) The chassis is unresponsive, or the IP address is not known

b) The Administrator password has been forgotten

c) The yellow COMM LED does not blink after the 2 minute boot cycle, even after a power cycle or press of the RESET button

4.6.3. Method

If you are sure you want to factory reset, hold down the RESET button near the RJ45 port for at least 10 seconds. The red status LED will be solid-on during this time, and once it turns off you can release the button and the reboot process will begin.

SERVICE & SUPPORT

6. Service & Support

6.1. Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products. Please contact ATX Customer Service to obtain a valid RMA number for any ATX products that require service and are in or out-of-warranty before returning a failed module to the factory.

RF & OPTICAL TECHNICAL SUPPORT
Tel: (905) 428-6068
Toll Free: (800) 565-7488 (USA & Canada only)
► Press *3 for **Technical Support**
► Then press 2 for **RF & Optical Products (MAXNET, SignalOn, HFC Enhance, PCI Filters, Q-Series, FLEXNET, SCN, SMAC, FiberLinx)**
Email: rfsupport@atxnetworks.com

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Toll Free Fax: (866) 427-1964 (USA & Canada only)
Web: www.atxnetworks.com
Email: support@atxnetworks.com

6.2. Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.

6.3. Safety

IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

WATER AND MOISTURE: Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

POWER SOURCES: The device should be connected to a power supply only of the type described in the operating instructions or as marked on the device.

GROUNDING OR POLARIZATION: Precautions should be taken so that the grounding or polarization means of the device is not defeated.

NOTE: A separate connection shall be made to ground the chassis using the ground bonding lug provided on the rear of the chassis. This connection should be protected from breakage and abuse.

POWER CORD PROTECTION: Power supply cords should be routed so that they are not likely to be pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the device.

SERVICING: The user should not attempt to service the device beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

FUSING: If your device is equipped with a fused receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.

CAUTION: For continued protection against the risk of fire, replace only with the same type and rating of fuse.
RF PAD COVER: During servicing, the pad cover may be removed to adjust the RF operation of the unit. Before placing back in service, the pad cover must be replaced.

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