SMAC™ Frequency Agile Pilot Carrier Redundancy Source

INSTALLATION & OPERATION MANUAL
# TABLE OF CONTENTS

1. OPERATIONAL DETAILS ......................................................................................................................... 1-1
2. INSTALLATION ......................................................................................................................................... 2-1
3. SET REDUNDANT OUTPUT FREQUENCY ............................................................................................. 3-1
4. SET REDUNDANT OUTPUT GENERATOR LEVELS & SWITCH THRESHOLD .................................... 4-1
5. SETTING HYSTERESIS ............................................................................................................................ 5-1
6. CONFIGURATION MENU .......................................................................................................................... 6-1
7. CONNECTION FOR NORMAL OPERATION ............................................................................................ 7-1
8. REPLACEMENT MODULE ORDERING INFORMATION ......................................................................... 8-1
9. SYSTEM PRIMARY TO SECONDARY SWITCH TEST ............................................................................ 9-1
10. MONITORING ........................................................................................................................................ 10-1
    10.1. Software Connection of Ethernet or Modem Communications Interface ................................. 10-1
    10.2. GUI (Graphical User Interface) Monitor ......................................................................................... 10-2
11. SERVICE & SUPPORT ............................................................................................................................ 11-1
    11.1. Contact ATX Networks ................................................................................................................... 11-1
    11.2. Warranty Information .................................................................................................................... 11-1
# Index of Figures and Tables

## Figures
- #1 Frequency Agile Pilot Carrier Redundancy Source Block Diagram ........................................ 1-1
- #2 PC’s Network Settings for Factory Default UPS IP Address ................................................... 10-1
- #3 Configuration Page .................................................................................................................. 10-3
- #4 Main Overview Status Page .................................................................................................... 10-4
- #5 Parameters Page ..................................................................................................................... 10-4
- #6 Analog Alarm Thresholds ......................................................................................................... 10-5

## Tables
- #1 Administration Level Parameters .......................................................................................... 10-3
- #2 Module Specific SNMP Parameters ...................................................................................... 10-5
1. Operational Details

- Generates a high level, internally redundant, agile frequency pilot tone.
- Monitor and control of all functions through front panel or over the data network (HMS compliant, SNMP v2c) or Web browser.
- LCD display shows the current alarms and allows detector thresholds to be set.
- Independent removable and replaceable power supplies provide full power redundancy.
- Compact 1RU chassis.
- Simple one-cable connection.
- Suitable for headend and hubsite applications.
- Front panel test points for oscillator levels and system output level monitoring.

Please refer to the web site www.atxnetworks.com (Resources and Support, then User documents) for up-to-date specification information.

**Figure #1: Frequency Agile Pilot Carrier Redundancy Source Block Diagram**
2. Installation

- Rack-mount the PCR-SW-A1 unit into your 19” equipment rack using a minimum of two 10 x 32 machine screws in the bottom two holes on the PCR chassis.
- Connect the PCR-SW-A1 unit to the system using the rear RF Out port.
- Connect two IEC 3-prong power cords between each of the two rear panel Power Supply jacks and two 120 VAC electrical outlets. For testing purposes, only one is required to be connected.
- The front panel LCD display should quickly flash the ATX Networks splash screen and then show the Status Summary screen indicating the status of the primary and secondary Oscillators and the status of the two Power Supplies.
- The OSC A & B and PS A & B should not be flashing to indicate that the Oscillators and Power supplies are in good working order and that the PCR-SW-A1 is detecting the system pilots.
3. Set Redundant Output Frequency

- Enter the STATUS SUMMARY screen by pressing the F1 key.
- Navigate to the SETUP screen using the UP/DOWN arrow keys and press the ENTER key, or the RIGHT arrow key to enter that menu.
- Press the ENTER key to enter edit mode. Use the LEFT/RIGHT arrow keys to select the digit you wish to modify. Use the UP/DOWN arrows to increase or decrease the value of the selected digit, then press the ENTER key to set the SMAC PCR unit to the displayed frequency.
- When the frequency change is complete, the SMAC PCR unit will return to the status summary screen.
- The primary will now be set to the displayed frequency and the secondary is set to the displayed frequency +20 kHz.
4. Set Redundant Output Generator Levels & Switch Threshold

- Enter the STATUS SUMMARY screen by pressing the F1 key.
- Navigate to the SETUP screen using the UP/DOWN arrow keys and press the ENTER key or the RIGHT arrow key to enter that menu.
- Press the UP/DOWN arrows to select the SET OUTPUT LEVEL screen.
- Press the ENTER key and the displayed output will begin flashing.
- Use the UP arrow to increase the level and the DOWN arrow to decrease the level. When the displayed output matches the desired output for the system, press the ENTER key to store. The displayed output will stop flashing indicating the SMAC PCR unit is now generating a redundant source at that display level.
- The switching threshold will automatically set to 2 dB below the displayed output reference level once the output level is set.
- To monitor the current generator source levels and set reference, press the F1 key to enter the STATUS SUMMARY.
- Navigate to the STATUS screen using the UP/DOWN arrow keys and press the ENTER key or the RIGHT arrow key to enter that menu.
- The primary and secondary levels will be listed beside the NOW= characters. The switching reference will be listed beside the REF= characters. Use the UP/DOWN arrows to select between the primary (OSC A LEVEL) and secondary (OSC B LEVEL) screens. All displayed levels are in dBmV.
5. Setting Hysteresis

- Press the F1 key to enter the STATUS SUMMARY.
- Use the UP/DOWN arrow keys to navigate to the SET-UP MENU. Press the ENTER key or the RIGHT arrow key to enter that menu.
- Use the UP/DOWN arrow keys to navigate to the SET HYSTERESIS screen.
- Press the ENTER key and the hysteresis character will begin flashing.
- Use the UP arrow key to increase the hysteresis value and the DOWN arrow to decrease the hysteresis value.
- When the desired system hysteresis value is set, press the ENTER key and the hysteresis character will stop flashing. The SMAC PCR unit will now function using the new hysteresis value.
6. Configuration Menu

- Press the F1 key to enter the STATUS SUMMARY screen.
- Use the UP/DOWN arrow keys to navigate to the CONFIGURATION MENU.
- Press the ENTER key or the RIGHT arrow key to enter the CONFIGURATION MENU.
- There are 3 sub screens in the CONFIGURATION MENU:
  SET BRIGHTNESS
  MODIFY NETWORK IP
  CURRENT FIRMWARE

- The SET BRIGHTNESS screen allows the user to modify the display keypad brightness levels. To modify the current level, press the ENTER key and the brightness character will begin to flash. Use the UP/DOWN arrow keys to increase or decrease the brightness level. Press the ENTER key to store the desired brightness level.

- The MODIFY NETWORK IP screen allows the user to change the SMAC PCR unit IP settings. To change the network IP settings press the ENTER key and the IP character will begin flashing. Use the LEFT/RIGHT arrow keys to change which character you wish to modify. Use the UP/DOWN arrow keys to increase or decrease the character. When the IP is set to the desired value, press the ENTER key to store. The display will automatically move to the MODIFY NETMASK and MODIFY GATEWAY display screens. The user can modify the system gateway and netmask the same way as the IP screen. After the user is finished setting IP, NETMASK, and GATEWAY, the SMAC PCR will automatically reboot the ethernet port and the unit will be at the new network settings after reboot.

- The CURRENT FIRMWARE screen will display the SMAC PCR unit current firmware revision.
This page left intentionally blank.
7. Connection for Normal Operation

- Press the F1 key to display the current STATUS SUMMARY of the SMAC PCR unit. The OSC A & B and PS A & B characters should be solid, indicating they are in good working order.
- If the OSC A or B character is flashing, this indicates that the primary (A) or secondary (B) generator level has dropped 2 dB or more below the switch threshold REFERENCE. If the PS A or B character is flashing, then this indicates that the power supply voltage has dropped below 22V. In either scenario, the SMAC PCR unit should be immediately serviced.
- The current individual internal primary and secondary generators can be monitored without system disruption by using the front OSC A and OSC B test point ports. These ports are -40 dB relative to the set system output level.
- The current SMAC PCR system output level can be monitored without system disruption by using the front OUTPUT test point port. This port is -40 dB relative to the set system output level.
8. Replacement Module Ordering Information

The following modules can be ordered if the system pilot frequencies change in your system. The chassis must be de-racked to change the pilot bandpass filter and redundant oscillator. The power supplies are replaceable while the chassis is in the rack.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCR-SW-A1AC</td>
<td>1RU Pilot Carrier Redundancy Source, Single Channel, Agile Frequency, includes Two AC Power Supplies</td>
</tr>
<tr>
<td>PCR-SW-A1DC</td>
<td>1RU Pilot Carrier Redundancy Source, Single Channel, Agile Frequency, includes Two 48 VDC Power Supplies</td>
</tr>
<tr>
<td>PCR-SW-xx/yy</td>
<td>1RU Two Pilot Redundancy Switch (xx/yy = pilot frequencies in MHz), AC Power</td>
</tr>
<tr>
<td>PCR-SW-xx</td>
<td>1RU One Pilot Redundancy Switch (xx = pilot frequency in MHz), AC Power</td>
</tr>
<tr>
<td>PCR-SW-DC-xx/yy</td>
<td>1RU Two Pilot Redundancy Switch (xx/yy = pilot frequencies in MHz), -48 VDC Power</td>
</tr>
<tr>
<td>PCR-SW-DC-xx</td>
<td>1RU One Pilot Redundancy Switch (xx = pilot frequency in MHz), -48 VDC Power</td>
</tr>
<tr>
<td>PCR-OSC-xx(1)</td>
<td>Replacement Oscillator (xx = oscillator frequency in MHz)</td>
</tr>
<tr>
<td>PCR-NBP-xx(1)</td>
<td>Replacement Narrow Bandpass Filter (xx = filter centre frequency in MHz)</td>
</tr>
<tr>
<td>PCR-PS</td>
<td>Replacement Power Supply Module, AC Power</td>
</tr>
<tr>
<td>PCR-PSV0(2)</td>
<td>Replacement Power Supply Module for Legacy SMAC Units</td>
</tr>
<tr>
<td>PCR-PS-DC</td>
<td>Replacement Power Supply Module, -48 VDC Power</td>
</tr>
</tbody>
</table>

NOTES:
(1) For non-frequency agile versions of PCR-SW. Can be ordered separately as backup modules or to change frequency of source & detection. Both OSC & filter required and must be same frequency as each other to function.
(2) Only required as replacement for original series of PCR-SW, ordered prior to 2010. A different power connector is used on these.
9. System Primary to Secondary Switch Test

- Press the F1 key to enter the STATUS SUMMARY.
- Use the UP/DOWN arrow keys to navigate to the SET-UP MENU. Press the ENTER key or the RIGHT arrow key to enter that menu.
- Use the UP/DOWN arrow keys to navigate to the SWITCH TESTING screen.
- Press the ENTER key to initiate the system primary to secondary switch test. The TESTING characters will flash indicating the test has initiated.
- Initiating the system test will mute the primary generator to simulate a system failure. The unit will automatically switch to the backup secondary source. The system test can be measured using the front test ports to monitor secondary backup generator levels and switch times. If measuring on a spectrum analyzer, the secondary will be at the primary frequency +20 kHz.
- To exit the system test and go back to normal operation, press the ENTER key. The TESTING characters will stop flashing indicating the unit is operating back in normal redundant operation.
10. Monitoring

10.1. Software Connection of Ethernet or Modem Communications Interface

By default the device ships with a static IP address of 192.168.0.1. If at any time the user chooses to revert back to the factory defaults, the reset button (located near the RJ45 port) must be held down for approx 10 seconds until the LED turns off. When the device reboots, it will have default passwords and IP address.

In order to connect to a device, the PC must be on the same subnet as the device. Open your Windows® Network Connections on the Control Panel. Right click your local area connection, then select Internet Protocol (TCP/IP) and click on Properties. Select ‘Use the Following IP address’ and enter the values shown to the right.

Now you can open any web browser and enter 192.168.0.1 in the URL field. A login page will appear, at which point you can log in as Administrator with the password of administrator. From here you can change the login password, upgrade the firmware of the device, or set the communication parameters.

Select DHCP if you choose to use your network’s DHCP server to provide an IP address, or choose static IP and assign a unique, unused IP that is part of your system’s subnet.

Enter in a list of IP addresses for trap recipients. These will be the computers that will be sent SNMP traps in the event of any alarm. Likewise you can enter a list of email addresses to receive a similar alarm message if you don’t have SNMP monitoring software. Consult your IT department for the outgoing mail server information required.

Note that all SNMP traps and emails shall include the Alias (entPhysicalAlias) of the device which is alarming. This is a user configurable text field that many customers use to identify the specific device (i.e. Nodes serviced, room or rack location, etc). This value is set using any SNMP manager software. See the next page.

![Figure #2: PC’s Network Settings for Factory Default UPS IP Address](image-url)
10.2. GUI (Graphical User Interface) Monitor

All SMAC PCR units come with a built in easy to use graphical user interface for monitor of the device. Use any standard Windows browser (i.e. Chrome™, Firefox®) and enter the device IP (default: 192.168.0.1) in the browser IP field to connect to the GUI.

Login using these default access level passwords:

- **Access Level: admin**
  - Password: admin

- **Access Level: operator**
  - Password: operator

- **Access Level: observer**
  - Password: observer

10.2.1. GUI (Graphical User Interface) Monitor - Configuration

The configuration page is only available to the administrator access level and allows the following system level changes to the device:
CHAPTER 10: MONITORING

Figure #3: Configuration Page

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostname/ Domain Name</td>
<td>Optional Fields</td>
</tr>
<tr>
<td>IP Address, Subnet Mask, Default Gateway</td>
<td>Define the static IP address of the chassis. This address is maintained during power cycles and firmware upgrades. A factory reset will revert the IP back to 192.168.0.1</td>
</tr>
<tr>
<td>DNS Servers</td>
<td>Enter the domain name server to be able to enter <a href="http://www">www</a>... URL's into any fields</td>
</tr>
<tr>
<td>NTP Server</td>
<td>If there is no network time server available leave this blank. All times are then counting from midnight, Jan 1st, 1970 as the start-up time</td>
</tr>
<tr>
<td>Time Zone</td>
<td>Only used if NTP server used. Adds local time zone offset to UTC time. e.g. for Eastern Standard Time Zone, enter ‘UTC+5:0’</td>
</tr>
<tr>
<td>Read-write Community Name</td>
<td>SNMP Required Variable</td>
</tr>
<tr>
<td>Read-only Community Name</td>
<td>SNMP Required Variable</td>
</tr>
<tr>
<td>Default Trap Community Name</td>
<td>SNMP Required Variable</td>
</tr>
<tr>
<td>Trap Recipient List</td>
<td>List up to 10 IP addresses that are to receive traps.</td>
</tr>
<tr>
<td>System Name, Location, Contact</td>
<td>Optional SNMP Fields</td>
</tr>
<tr>
<td>SMTP Server</td>
<td>Mail Server</td>
</tr>
<tr>
<td>Email Recipient List</td>
<td>List up to 5 email addresses that are to receive an email form of the traps.</td>
</tr>
<tr>
<td>SMTP Username, Password</td>
<td>If authentication required, must enter an email user name and password.</td>
</tr>
</tbody>
</table>

| Table #1: Administration Level Parameters |
10.2.2. GUI (Graphical User Interface) Monitor - Status

The main status page gives a quick overview of the current status of the primary and secondary sources. The default operation of the device will list each source in a white box to indicate no alarms are present. If a failure occurs, the white box will shade red indicating an alarm condition. Beneath the sources display is a list of up to 16 dated alarm logs giving more specific details on a possible alarm condition.

![Main Overview Status Page](image)

**Figure #4: Main Overview Status Page**

10.2.3. GUI (Graphical User Interface) Monitor - Parameters

Clicking on either primary or secondary source box will open a more detailed parameters page. All analog current variable measurements can be viewed including voltage, current, power, temperature, current switch threshold, and current source output level.

Any specific alarms will highlight the parameter in red. To switch between the primary and secondary sources, press the Prev and Next buttons.

![Parameters Page](image)

**Figure #5: Parameters Page**
10.2.4. GUI (Graphical User Interface) Monitor - Analog Alarm Thresholds

Select the Analog tab to open the device’s current alarm threshold table. All measured analog values will generate an alarm if the value is above or below the listed variables.

![Figure #6: Analog Alarm Thresholds](image)

10.3. SNMP Monitor

SMAC PCR units are HMS compliant (SNMPv2c) and can be monitored with any commercial MIB browsing software using standard SCTE MIBs. To monitor the device the following SCTE modules are required:

- RFC115-SMI
- SNMPV2-SMI
- SCTE-ROOT
- SCTE-HMS-ROOTS
- SCTE-HMS-HEADENDIDENT-MIB
- SCTE-HMS-HE-RF-MIB

The following MIBs are supported with the SMAC PCR:

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Description</th>
<th>HMS MIB Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Description of the module</td>
<td>entPhysicalDescr</td>
</tr>
<tr>
<td>Name</td>
<td>Indicates the chassis slot of the module</td>
<td>entPhysicalName</td>
</tr>
<tr>
<td>Alias</td>
<td>Optional user defined field - added to fifth variable binding of traps</td>
<td>entPhysicalAlias</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>ATX</td>
<td>entPhysicalMfgName</td>
</tr>
<tr>
<td>Model</td>
<td>ATX model number</td>
<td>entPhysicalModelName</td>
</tr>
<tr>
<td>Asset ID</td>
<td>Optional user defined field</td>
<td>entPhysicalAssetID</td>
</tr>
<tr>
<td>Serial No</td>
<td>Module’s serial number</td>
<td>entPhysicalSerialNum</td>
</tr>
<tr>
<td>Hardware Rev</td>
<td>Hardware rev of module</td>
<td>entPhysicalHardwareRev</td>
</tr>
<tr>
<td>Firmware Rev</td>
<td>Firmware rev of module</td>
<td>entPhysicalFirmwareRev</td>
</tr>
<tr>
<td>Temperature [C]</td>
<td>Module’s current temperature</td>
<td>heCommonTemperature</td>
</tr>
<tr>
<td>Date and Time</td>
<td>Current date of unit in Y/M/D/H/min/sec</td>
<td>heCommonTime</td>
</tr>
<tr>
<td>Temperature</td>
<td>Current operating temperature of unit</td>
<td>heCommonTemperature</td>
</tr>
<tr>
<td>P.S. Description</td>
<td>Description of the voltage supplied to the internal power supply of the module</td>
<td>hePsUnitDescription</td>
</tr>
<tr>
<td>P.S. Voltage Out [Volt]</td>
<td>Unit measures both 24V inputs from the redundant supplies. Displayed voltage and power is the lesser of the two values. If either PS fails, the voltage displayed will be the failed value.</td>
<td>hePsUnitVoltageIn</td>
</tr>
<tr>
<td>P.S. Current Out [mA]</td>
<td>Current supplied to the unit from the combined 24V supplies</td>
<td>hePsUnitCurrentIN</td>
</tr>
<tr>
<td>P.S. Power Out [Watts]</td>
<td>P.S. Voltage * P.S. Current</td>
<td>hePsUnitPower</td>
</tr>
<tr>
<td>heRFAmplLevel</td>
<td>When output level is set, this value is set as the reference level. The redundant switching threshold is 2 dB below this value. This value is also stored as the analog alarm LO value</td>
<td>analogAlarmLO</td>
</tr>
<tr>
<td>Osc Output Description</td>
<td>Description of source output level in dBmV</td>
<td>heRFAmplOutputDescription</td>
</tr>
<tr>
<td>Switch Threshold [dBmV]</td>
<td>Level in dBmV where the unit will switch from the primary to the secondary source. This level is 2 dB below the reference output level set.</td>
<td>heRFAmplOutputLevel</td>
</tr>
<tr>
<td>Osc Output Level [dBmV]</td>
<td>Current output level of primary or secondary generator source in dBmV</td>
<td>heRFAmplOutputLevel</td>
</tr>
</tbody>
</table>

Table #2: Module Specific SNMP Parameters
CHAPTER 10: MONITORING

POWER-UP SCREEN

OSC & PS: fast flash if any failures

STATUS SUMMARY

TO STATUS PARAMETERS
BACK TO STATUS MENU

TO SET-UP PARAMETERS
BACK TO SET-UP MENU

TO CONFIG PARAMETERS
BACK TO CONFIG MENU

MODIFYING SETTINGS

ENTER TO EDIT VALUE
SELECT DIGIT TO EDIT
MODIFY VALUE

Set OscFreq
499.250 MHz

Set Osc Level
now = 50.0 dBmV
ref = 50.0 dBmV

Set Output Level
now = 50.0 dBmV

Set Brightness
now = 4
allow 0..9

Set Hysteresis:
HYS = 1 dB

Modify Network IP
IP = 192.168.0.001

Modify Network GW
IP = 192.168.0.254

Modify Network NM
IP = 255.255.255.000

Current firmware
Nov 21 2017 V3.4

After ENTER is pressed, reboot process begins

Enter initiates mute of PRIMARY and switch to SECONDARY. Testing flashes during the test. Hit ENTER to end test.
11. Service & Support

11.1. 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 Products**
(MAXNET, SignalOn, HFC Enhance, PCI Filters, Q-Series, SCN, SMAC, FiberLinx)

**TECHNICAL SUPPORT**
Tel: (905) 428-6068 – press *3 then press 2
Toll Free: (800) 565-7488 – press *3 then press 2 (USA & Canada only)
Email: rfsupport@atxnetworks.com

**CUSTOMER SERVICE**
ATX Networks
1-501 Clements Road West
Ajax, ON L1S 7H4 Canada

Tel: (905) 428-6068 – press *1
Toll Free: (800) 565-7488 – press *1 (USA & Canada only)
Fax: (905) 427-1964
Toll Free Fax: (866) 427-1964 (USA & Canada only)
Email: support@atxnetworks.com
Web: www.atxnetworks.com

11.2. Warranty Information

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