



IPCopper.com

USC10M3

10G Packet Capture Appliance
with Redundant Power Inputs, Bypass and GPS



Product Manual

Firmware Version 2.10

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Introduction

PRODUCT DESCRIPTION

The IPCopper USC10M3 is a standalone full packet capture appliance with 2 x 10GBASE-SR and 4 x GbE ports, 48 TB storage and redundant power inputs.

Key features include:

- True bypass: In case of power loss or malfunction the USC10M3's ports switch into bypass mode to minimize network disruption. Bypass may also be manually engaged and disengaged through the management utility.
- GPS time synchronization: At bootup, the USC10M3 synchronizes to the broadcast GPS time for high-accuracy timestamping and indexing.
- Continuous-loop storage: WARNING! The USC10M3 contains a built-in functionality that overwrites the oldest data with the newest. When the USC10M3 reaches its 48 TB capacity, it starts over from the beginning, overwriting the oldest recorded data with the newest. The oldest data, once overwritten, is irrecoverable. The data stored on the unit will always be the most recently captured 48 TB of network activity.

SECURITY FEATURES

- Electronic invisibility: For its packet capture operations the USC10M3 uses neither an IP address nor a MAC address. This stealthiness increases the security of the appliance, while at the same time making installation as easy as connecting a few cables.
- Removable key: Unit will not boot up without the key.
- 20,000-bit dual encryption.
- Sealed all-metal, high-strength, tamperproof stainless steel enclosure.
- Encrypted access via management utility.
- Physical access control: Enable/disable retrieve mode via front panel button.

SPECIFICATIONS

Interface	2 x 10GBASE-SR + 4 x 1-GbE
Capacity	48 TB continuous-loop storage
Bypass	Automatic and manual <ul style="list-style-type: none">For more information see page 24
Capture & Record Speeds	<ul style="list-style-type: none">Peak: 10 GbpsMinimum Sustained: 8 GbpsMax Sustained: 6,000,000 ppsFor more information see page 17
Data Output Format	PCAP
Encryption	Dual, with 20,000-bit key
GPS Time Synchronization	<ul style="list-style-type: none">Via removable, external antennaManual enable/disableFor more information see page 18
Power Supply	90 ~ 264 VAC, 47 Hz ~ 63 Hz
Redundant Power Inputs	<ul style="list-style-type: none">Standard AC, 12V SLA battery and general purpose 12V DCMini-Fit JR 5557 8-position connectorRecommended battery: 12V SLA; floating charge voltage of 13.5V; > 30AhFor more information see page 25
Power Consumption	<ul style="list-style-type: none">Peak: 250WTypical: 100-125W
Environmental	Storage temperature: -20 °C to +70 °C Operating temperature: 0 °C to +30 °C*
Dimensions	19 in x 3.5 in x 19 in; 37 lbs
Other	<ul style="list-style-type: none">Flow control supportedJumbo frames supported up to 9 KB

** The USC10M3 may operate at slightly higher temperatures, however, care must be taken to ensure that there is at least one foot of unobstructed air space in front of the vents, to avoid the possible backflow of exhausted air into the unit. If placed in a cabinet, the cabinet must be ventilated.*

IN THE BOX

- 1 - USC10M3 packet capture appliance
- 1 - GPS antenna
- 1 - Power cord
- 1 - USB stick, white (contains management utility)
- 1 - USB stick, black (contains key)*

*** IMPORTANT! DO NOT INSERT THE BLACK USB KEY INTO A COMPUTER OR ANY DEVICE OTHER THAN THE USC10M3 WITH WHICH IT CAME. DOING SO MAY DAMAGE THE KEY AND RENDER IT NONFUNCTIONAL.**

Installation

GENERAL INSTALLATION

TIP: Before connecting the USC10M3 to power, please read about the appliance's power input options on page 25.

1. Connect the fiber and/or Ethernet cables.
 - ▶ If using inline, traffic feeding into port 1 will exit out port 2 and vice versa. Likewise, traffic feeding into port 3 will exit out port 4, traffic feeding into port 5 will exit out port 6 and vice versa.
 - ▶ If using a SPAN/mirror port, connect to any port (of appropriate speed / type). Please see page 44 for information on using the management utility to switch ports into dedicated SPAN mode.
 - ▶ Alignment is important when inserting the fiber connectors into the fiber ports. Depending on the cable, the duplex retention bracket could skew the positioning of the optics if care is not taken to align the connectors properly when attaching the fiber cables.
2. Firmly insert the black USB key.
 - ▶ Use the black USB key that came in the box with the unit. This key will only work with the unit with which it came and cannot be used with any other IPCopper device. *Do not insert this black USB key into any other equipment as this may cause it to malfunction.*
3. Connect the AC power cable and flip both the AC power switch and the master power switch to their ON positions.
 - ▶ The unit will power on and boot up automatically. The first stage of the boot up process is self diagnostics, which takes about 5-20 seconds.
 - ▶ During bootup, the red KEY light will illuminate and the COM light will blink, indicating that the unit is communicating with the key. After the unit establishes that it is the correct key, the green KEY light will illuminate and the unit will proceed to the next stage. This process takes about 5-30 seconds.
 - ▶ During bootup, the USC10M3 receives signals from at least three GPS satellites and synchronizes its clock to the broadcast GPS time. During this synchronization process, the green GPS light blinks with increasing frequency as time synchronization progresses. Depending on the

reception strength, it may take up to half an hour for the unit to synchronize (for more information see page 18).

- To skip GPS time synchronization, press the RET button one time while the GPS light is blinking. GPS time synchronization may also be disabled through the management utility (see page 21).

Once the unit is operational and recording, the green REC illuminates. At this point the key has been loaded into the unit's temporary memory and you may choose to remove the key or leave it in place. If you choose to remove the key, it is advisable that the unit be connected to a UPS; if the unit loses power, it will not be able to boot up again until the key is re-inserted.

If the error light illuminates, see the troubleshooting section on page 51.

RECOMMENDED OPERATING CONDITIONS

In general, the recommended operating condition for the USC10M3 is to connect the standard AC inlet to power with an external surge protector located between the AC power inlet and the AC power source and to connect power input #2 to a backup battery of 30Ah or more. The external surge protector would protect the unit from spikes and surges in the AC power system. In the event of a power surge or spike, the external surge protector may suffer damage, however, it should protect the unit.

If the USC10M3 is installed at a location that frequently experiences unstable power, it may be advisable to use an external AC/DC converter connected to power input #1 instead of the standard AC inlet.

For more information on the USC10M3's different power inputs, see page 25.

INLINE VS. SPAN DEPLOYMENT

There are two methods for capturing data, either inline on the wire or via a router or switch's SPAN / mirror port. Since the USC10M3 has multiple ports, a combination of inline and SPAN modes may also be employed. For more information on the USC10M3's port modes, please see page 23.

Setting up the USC10M3 inline on the wire is simple, involving the connection of either two or four or six cables (for capturing traffic on one, two or three

routes). When used inline, port 1 corresponds to port 2, port 3 to port 4 and port 5 to port 6. The biggest advantage of inline mode is the higher accuracy of recording: no intervening equipment stands between the USC10M3 and the raw traffic and the unit is able to capture and timestamp the data exactly as it traverses the wire. Another benefit is that it allows the unit to act as a buffer for other networking equipment, should traffic spike.

SPAN mode allows the recording of up to six networks or network routes on one USC10M3. The drawback of using SPAN mode is that it relies on the performance of the equipment mirroring the traffic (oftentimes a switch or a router with a SPAN port) and therefore introduces uncertainty as to the accuracy of the captured activity. The intervening equipment may re-order or drop packets; when using SPAN/mirror ports, it is quite possible to have a packet traverse the switch or router, but not be mirrored and pass out through the SPAN port. Having intervening equipment between the packet capture appliance and the source of the network traffic also introduces a delay in the packets reaching the unit, resulting in inaccurate timestamping.

Lastly, you may also have a situation where the router or switch is attempting to feed data in excess of 10 Gbps through its SPAN/mirror port, since the traffic sent out through the SPAN/mirror port is an aggregate of all the traffic received and sent by the router/switch in both directions. Under peak loads, the switch/router may drop packets intended for the SPAN/mirror port should the traffic volume overwhelm the switch/router's buffer.

PLACEMENT / WHERE TO DEPLOY

The USC10M3's six ports and user-selectable port modes provide flexibility and versatility when it comes to deployment. The unit may be used to monitor from one to six separate networks or network segments. The USC10M3 may be placed anywhere on a network, either at the perimeter, the core or points in between; it requires no additional equipment to connect when used in inline mode, since it acts as its own network tap.

The USC10M3 captures all of the traffic that passes through it. Please note, however, that if a DHCP/NAT server (which is frequently built into consumer firewalls and routers) stands between the unit and the rest of the network or a portion of the network, the DHCP/NAT server device will mask the MAC addresses and local IP addresses of the equipment on the other side of it. If

the MAC addresses and local IP addresses are needed, it would be necessary to deploy an additional packet capture appliance on the other side of the DHCP/NAT server device (for example, the DHCP/NAT server device connects to the packet capture appliance, which in turn connects to a switch; the other networked equipment/end-users would connect to the switch).

Depending on the size of your network and the type and granularity of the monitoring/recording required, if possible we recommend deploying multiple packet capture appliances throughout, precisely to capture the additional information that DHCP/NAT devices mask, as well as internal communications between computers and other devices on the network that would never make it out through the internet connection.

DEPLOYING THE USC10M3 AT A REMOTE LOCATION

If you intend to deploy the USC10M3 at a separate location and will be accessing it remotely, you may need to open UDP and TCP/IP ports on the firewall at the USC10M3's location (and possibly on any routers in between the firewall and the unit) for the utility to use to connect to the unit. Please consult your firewall's/router's documentation for information on how to do this. For more information on using the management utility to access the USC10M3 from a remote location, please see page 39.

For remote deployment it would be advisable to change the unit's retrieve mode boot setting so that the unit boots up with retrieve mode on by default (see page 44 for instructions). When retrieve mode is off, the unit will not respond to any management communications and it will be necessary to manually toggle the unit into retrieve mode by pressing the retrieve button on the unit's front panel in order to communicate with the unit.

DEPLOYMENT SCENARIOS

The USC10M3 can be placed pretty much anywhere on a network. Where you choose to place the unit depends on which traffic you would like to capture. Using the USC10M3 in inline mode offers the most flexibility for deployment, however, it may also be connected to a router or switch's SPAN/mirror port. See a sampling of deployment scenarios on the following page.



In this scenario, the USC10M3 is placed at the network perimeter, between the internet connection and the firewall. In this location, the unit will capture all traffic originating from the internet, even the transmissions that the firewall would block, and all the outbound traffic from the network, but none of the internal network traffic.



In this scenario, the USC10M3 is placed at the network perimeter, between the firewall and the LAN. In this location, the unit will capture all traffic originating from the internet, minus the traffic blocked by the firewall, and all the outbound traffic from the network, but none of the internal network traffic.



In this scenario, the USC10M3 is placed further inside the network, inline between a workgroup's router and the rest of the LAN. In this location, the unit will capture all traffic originating from the workgroup and all traffic destined for the workgroup. Please note that in this configuration a DHCP router will obscure the local IP addresses of the workgroup's networked equipment. The unit will not be able to capture any traffic that does not leave the workgroup.



In this scenario, the USC10M3 is placed inline between a workgroup's switch and the rest of the LAN. In this location, the unit will capture all traffic originating from the workgroup and all traffic destined for the workgroup, along with all the traffic within the workgroup itself. The advantage of this setup is that the unit would be able to capture the local IP address and MAC addresses of the workgroup, since there is no DHCP router in between the unit and the workgroup members.



In this scenario, the USC10M3 is placed inline between a database or other type of server. In this location, the unit is able to capture and record all traffic going to and from the database/server.

Understanding the Front Panel

INDICATOR LIGHTS

- REC: illumination indicates that the unit is operational and ready to capture and record
- RET: illumination indicates that the unit is in retrieve mode; also illuminates during GPS time synchronization
- COM: lights up when communicating during data retrieval, during the second stage of GPS time synchronization (see page 18) and when communicating with the USB key.
- LOOP: shines red after the initial 48 TB capacity has been reached and the unit has begun overwriting data (see page 33)
- ERR: indicates an error (see page 51)
- HDD: indicates that the hard drive is engaged
- GPS: blinks during GPS time synchronization (see page 18)



RETRIEVE BUTTON*

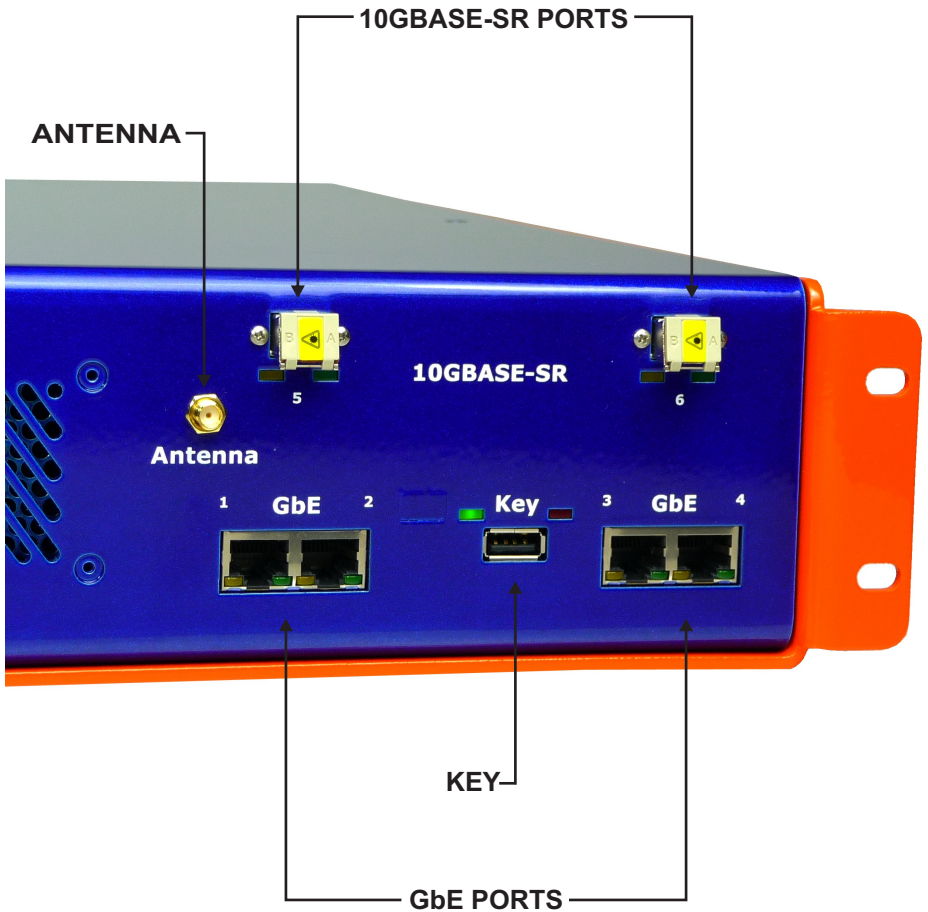
REBOOT BUTTON**

POWER BUTTON***

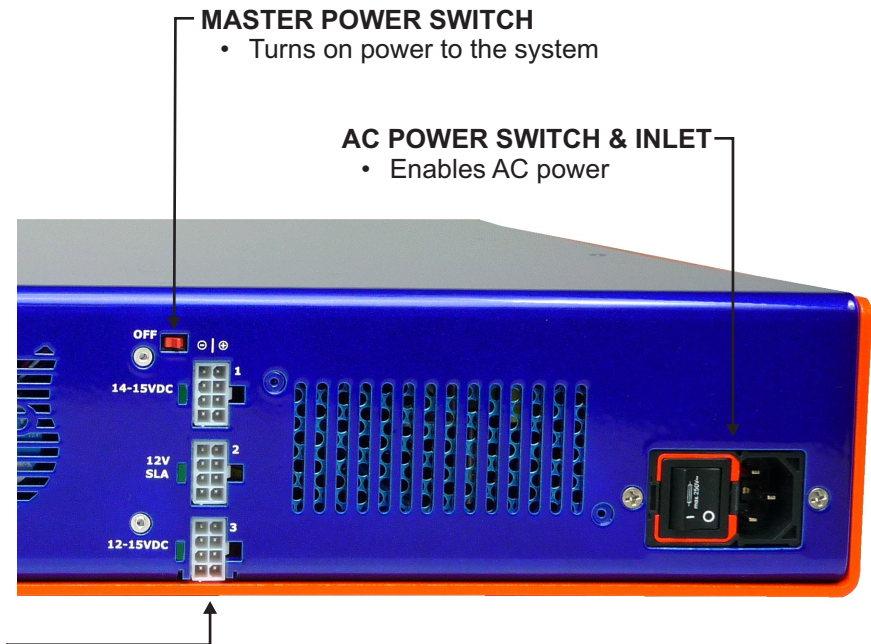
- * The retrieve button has two functions. If the REC light is on, the retrieve button acts as a manual switch to enable/disable retrieve mode. If the REC light is off, all ports are in bypass mode and pressing the retrieve button switches ports 1 and 2 into inline mode.
- ** Pressing the reboot button initiates an abrupt reboot, which may cause data loss or corruption. It may take 3-4 seconds for the unit to reboot after pressing reboot button.
- *** The power button may be toggled between two functions, initiating the shutdown sequence (default) or initiating a reboot. Please see pages 15 and 25 for more information.

PORT INDICATOR LIGHTS

- ORANGE: indicates port is operating at gigabit / 10-gigabit speed
- GREEN: indicates connectivity
- NO LIGHTS: either port is in bypass mode or there is no connectivity



Understanding the Back Panel



ALTERNATE POWER INLETS

- 1: Accepts 14-15V external AC/DC power adapter — do not use concurrently with the standard AC power inlet.
- 2: Accepts 12V SLA battery (see page 27 for battery requirements and recommendations).
- 3: General purpose DC inlet, accepts 12-15VDC.
- The individual LEDs do not indicate whether a power inlet is in use but whether power is connected and available through the individual inlet.
- See page 25 for more information on using the redundant power inlets, including appropriate power connectors, battery types, acceptable power sources and operating conditions to avoid.

IMPORTANT! READ PAGES 25 - 32 BEFORE USING THE REDUNDANT POWER INLETS. FAILURE TO CONNECT POWER SOURCES APPROPRIATELY OR USING IMPROPER POWER SOURCES MAY CAUSE DAMAGE AND VOID THE LIMITED WARRANTY.

Shutdown Sequence

STANDARD SHUTDOWN SEQUENCE (PREFERRED)

When the power button is configured with power off functionality (which is the default setting), pressing the power button initiates the shutdown sequence, during which the unit engages bypass, clears its buffers and stops recording. Please follow the steps below to avoid data loss when powering down the USC10M3.

1. Press the power button on the front. The REC light will begin blinking.
2. Wait until the REC light ceases blinking. All indicator lights will illuminate and the power button light will turn off. At this point the unit has finished clearing its buffers and stopped recording.
3. Flip the master power switch on the back of the unit to the OFF position, then flip the AC power switch to the OFF position.

IMPORTANT! ALWAYS FLIP BOTH POWER SWITCHES ON THE BACK TO THE OFF POSITION AFTER INITIATING THE SHUTDOWN SEQUENCE. If the back power switches are not turned OFF, the fan(s) will continue to run.

The shutdown sequence cannot be aborted. Once the shutdown sequence has been initiated by pressing the power button on the front panel, it must be completed as per the steps above. After the power button has been pressed, the unit will not respond to the pressing of any buttons on the front panel until the master and AC power switches on back have been toggled OFF, then ON again.

REBOOT SHUTDOWN SEQUENCE

Pressing the reboot button causes an abrupt reboot, which may result in data loss or corruption. Rebooting the unit via the management utility, as opposed to the front panel button, is a safer way to reboot the unit.

When the power button is configured as reboot, pressing the power button will cause the unit to cease recording and reboot, without processing the data that was in its buffer. When the REC and RET lights and all port lights turn off, it is safe to turn off the power switches on the back of the unit. *Switching off the power switches before the REC, RET and port lights turn off may cause data loss or corruption.*

Capture and Record Speeds

PEAK AND MINIMUM SUSTAINED SPEEDS

The USC10M3 provides combined peak capture speeds on its 10GBASE-SR ports of 10 Gbps. Its four GbE ports peak at 1 Gbps.

The unit's minimum sustained capture speed is 8 Gbps. Its maximum sustained packet rate is 6 million packets per second. At this rate the overhead is approximately 16 to 20 bytes per packet. Please note that the unit records the packets in their entirety, including the 4 byte checksum.

The maximum storage speed is over 8 Gbps, including overhead.

FACTORS THAT AFFECT PERFORMANCE

If necessary, at times of higher utilization on the 10GBASE-SR ports, the USC10M3 will sacrifice performance on the 1-GbE ports in favor of 10G traffic.

Under some circumstances, very frequent status checks (for example, more than once every few minutes) and data retrieval requests may affect performance. In those circumstances, instead of achieving a performance of six million packets per seconds, you may see a 1% reduction in performance, proportional to the frequency of the management utility's control packets.

CTRL MARKER AND PERFORMANCE

Each port has a CTRL marker, which may be turned on or off. Only the ports with this marker turned on will be able to recognize and accept management packets from the utility. Turning the CTRL marker off on the 10G ports, however, increases capture and record performance to their full operational capabilities; turning the CTRL marker on drops the 10G ports' performance by as much as 40% to 50%. *For best performance on the 10GBASE-SR ports, we recommend turning the CTRL marker OFF for both 10GBASE-SR ports at installation and using one of the GbE ports for management.*

The CTRL marker is enabled/disabled for each port through the management utility (see page 44). By default, the CTRL marker is ON on all ports.

GPS Time Synchronization

ANTENNA PLACEMENT AND SPECIFICATIONS

When attaching the GPS antenna, firmly screw it into place on the front of the USC10M3 without bending the cable. Once you have attached the antenna, we do not recommend disconnecting it. Repeatedly detaching and reattaching the antenna may result in damage to the connector.

Place the antenna as reasonably close to a window as possible; the closer to a window the antenna is, the better the signal reception. Elevating the antenna may improve reception, but the best placement depends on the height of the nearest window and the visibility through it to the sky.

The antenna has a magnetic base, however, we strongly advise against placing the magnetic base on the USC10M3's enclosure. Placing a magnet on the unit's enclosure may harm the internal parts and cause malfunction.

The supplied antenna type has been tested indoors with the USC10M3 and performs well. Depending on the placement of your unit, a more sensitive antenna may improve the speed of signal acquisition (regardless of the sensitivity of the antenna, having a window nearby is necessary and the closer the better).

Please use the following specifications if you elect to use your own antenna:

- ▶ Active GPS antenna
- ▶ Minimum 10 Mhz bandwidth
- ▶ 1.5 dB recommended noise figure
- ▶ 1575 MHz
- ▶ 50 Ω Ohm impedance
- ▶ 3 VDC

Note on antenna cable length: Antenna cables attenuate the signal and the longer the cable, the weaker the signal. To counteract this, we recommend using low noise cables designed for wifi / GPS applications. The longer the cable length, the thicker it needs to be to reduce noise and attenuation. IPCopper units have been tested with cables over 75 feet in length.

STAGES OF GPS TIME SYNCHRONIZATION

GPS time synchronization takes place in three stages.

During the first stage, the GPS light on the front panel blinks slowly as the unit initially acquires the signal from three or more GPS satellites. The unit requires at least three satellites to ensure the accuracy of the GPS time synchronization (and to avoid the possibility of GPS signal spoofing).

During the second stage the GPS light continues to blink slowly and the COM light illuminates. At this stage, the system has recognized the stored locations of the GPS satellites, but has not yet synchronized the time. Acquisition is almost complete once the second green (RET) light illuminates; the unit has been able to receive the necessary clock information from the three GPS satellites, but has not yet locked in on the satellites.

The USC10M3 has entered the third stage of synchronization once the GPS light begins blinking rapidly. The unit is now actively tracking the satellites and synchronization is imminent, waiting only for the computations to complete.

Once GPS time synchronization has completed, the GPS light will shine steadily and the COM light will turn off.

It generally takes several minutes for the unit to acquire and identify the GPS signals from a cold start, as the unit first roughly figures out where it is in relation to the satellites and begins computations. These computations become finer and finer until the unit locks on the GPS time signal.

If the USC10M3 was in storage (offline) for several days or longer, it is possible for the internal clock to have drifted slightly. If so, it may take longer than usual for the GPS time synchronization to complete the first time the unit is booted up after being offline for a long period of time because the unit would need to re-synchronize its own internal indices.

In some circumstances, it may take up to half an hour for GPS time synchronization to complete. If unable to synchronize, a timer will abort GPS time synchronization after 30 minutes and the unit will finish booting up without GPS time synchronization.

FASTGPS OPTION

Out of the box, FASTGPS is on by default.

GPS satellites and the GPS system track time in GPS Time, rather than Greenwich Mean Time (GMT). Due to the rotation of the earth, errors accumulate over time and from time to time the committee that oversees GPS Time adds an extra second to GPS Time in order to compensate for these errors. These added seconds are known as leap seconds.

During GPS time synchronization, waiting for the satellites to broadcast the current leap second data may add time to the synchronization process, however, this does ensure that synchronization takes place with the most accurate data.

FastGPS may speed up GPS time synchronization. When FastGPS is enabled, the unit synchronizes its time without waiting for the satellites to broadcast the leap second data, instead using the previously stored leap second data for synchronization. Should the satellites broadcast the current leap second data while the unit is going through the other synchronization steps, however, the unit will synchronize using the current leap second data.

When using FastGPS, the unit may synchronize to a time that is one second off of the actual GPS time (depending on when the GPS time committee last added a second and when your unit last received the leap second data).

KEEPING UP WITH GPS LEAP SECONDS

The committee that oversees GPS leap seconds generally makes adjustments every few years and typically the media reports on the changes. To keep up with any adjustments made to the GPS leap second data, please use either of the two procedures below.

If you have FASTGPS enabled:

If your unit is currently deployed and in operation with the GPS antenna connected and has been so for more than thirty minutes, simply issue a reboot command through the utility. Since the unit had been operational with the antenna connected for longer than thirty minutes prior to reboot, upon

reboot (if GPS synchronization is enabled), the unit would already have acquired the then-current GPS leap second and use it to synchronize its clock and continue operations.

If the unit has not been in operation and FASTGPS is enabled, it is recommended that you connect the antenna, boot up the unit and allow it to operate for at least thirty minutes before issuing the reboot command through the utility. During these thirty minutes, the unit should be able to acquire the current leap second data from the GPS satellites and use it on the subsequent reboot.

If you want the unit to wait and synchronize with the most recent GPS leap second data before proceeding to recording operations, disable FASTGPS through the utility and follow the steps outlined below under “*If you have FASTGPS disabled.*”

Please note that obtaining the leap second data may take anywhere from a few seconds to an hour due to GPS’s slow data transmission speed.

If you have had the antenna disconnected from the unit or the unit has been offline for more than a week, it may be advisable to increase the waiting time before rebooting to an hour.

If you have FASTGPS disabled:

After connecting the GPS antenna, issue a reboot command through the utility. The unit will go through the full GPS time synchronization process before beginning recording.

Obtaining the leap second data may take anywhere from a few seconds to an hour. If the unit is unable to obtain the leap second data within thirty minutes, GPS time synchronization will time out and the unit will finish booting up without the current leap second data. If this occurs, you would need to issue a second reboot command to the unit to restart the GPS synchronization process.

ABORTING/DISABLING GPS TIME SYNCHRONIZATION

We strongly recommend always using GPS time synchronization, not only for

accuracy, but also for coherency. When the unit is off, it is possible for the internal circuitry that keeps the lock on the GPS signal alive to fail or malfunction. When this occurs, it may affect the clock. If on the subsequent power-up GPS time synchronization is disabled, the data timestamps may not be accurate; in fact, it may create an incoherency in the data indices with either gaps or overlaps in the timestamps. Should this occur, re-synchronize the unit's time using GPS time synchronization and then run a large amount of traffic through the unit, enough to overwrite the incoherent sections. The probability of this circumstance arising is rather low, nevertheless, we do recommend using GPS time synchronization to avoid it.

You may abort GPS time synchronization during bootup any time while the GPS light is blinking by pressing the RET button one time. This will abort the current synchronization; at the next bootup, GPS time synchronization will proceed as normal.

You may disable GPS time synchronization through the management utility (see page 44). Choose the option to change settings, then follow the instructions on the screen to toggle GPS time synchronization off. The unit will not attempt to synchronize its clocks again until you re-enable GPS time synchronization through the utility.

Port Modes

OVERVIEW

The USC10M3 features two 10GBASE-SR fiber ports and four 1-GbE ports. The ports may be configured independently or in pairs via the management utility. Each port has two small indicator LEDs, one orange and one green. When illuminated, the orange light indicates that the port is operating at gigabit or 10-gigabit speed. The green light indicates connectivity. If both green and orange lights are off, either the port is in bypass mode or it has no connectivity.

- ▶ *For a comparison of inline versus SPAN, please see page 9.*
- ▶ *To change settings via the management utility, please see page 44.*
- ▶ *Please also read about the CTRL marker on page 17.*

INLINE MODE

When in inline mode, the ports operate in pairs. Port 1 pairs with port 2, port 3 with port 4 and port 5 with port 6. Traffic entering on port 1 will exit on port 2, and vice versa. Likewise with ports 3 / 4 and 5 / 6. When one or all pairs are in inline mode, it is not necessary to designate a port for management; any port in inline mode may be used for communicating with the management utility and retrieving data, unless the CTRL marker has been turned off (see CTRL Marker and Performance on page 17).

Should a malfunction or power loss occur when ports are in inline mode, the unit will automatically switch the inline ports over to bypass mode.

SPAN / MIRROR MODE

Use SPAN / mirror mode when connecting the port to the SPAN or mirror port on another piece of equipment. In this mode, the port can only receive and record data; it does not pass it through to any other port or send data out.

When in SPAN mode, a port cannot be used for data retrieval or status checks, though it is possible for the unit to receive communications from the management utility through it, provided retrieval has been enabled and the CTRL marker for the port is on. Should all six ports be in SPAN mode, to

initiate access to the unit you will need to connect a computer directly to one of the ports, toggle the unit into retrieve mode and then use the management utility to switch the port into either management mode or inline mode (please note that switching a port into inline mode will also switch its partner port into inline mode). Please note that if the CTRL Marker is OFF, the port will be unable to recognize any communications from the management utility.

If you change a port from either inline mode or bypass mode to span mode, its partner port will automatically switch into management mode, however, you may manually change that second port to SPAN mode, if desired. For example, if ports 1 and 2 were previously in inline or bypass mode and you change port 1 to SPAN mode, port 2 will automatically switch to management mode.

BYPASS MODE

Any pair of ports in inline mode will automatically switch over into bypass mode, should the unit malfunction or lose power. Bypass mode may also be engaged and disengaged manually through the management utility. It is possible to have all pairs of ports manually switched into bypass mode, however, this would make it impossible for the management utility to communicate with the unit (should all ports be in bypass mode, the REC indicator light will be off). In this circumstance, pressing the retrieve button will switch ports 1 and 2 into inline mode.

MANAGEMENT MODE

Management mode is useful for communicating with the unit when the other ports are in SPAN mode. When in management mode, it is possible to set both an IP address and a MAC address for the port (using the management utility). The IP address and MAC address may be any of the user's choosing and are not significant to the capture and record functions of the appliance.

When in management mode, a port cannot be used for capturing data, but only for communicating with the management utility. Even when in management mode, the appliance maintains a stealthy profile and will not respond to any attempts to elicit a response (other than ARP requests) unless they come from the management utility.

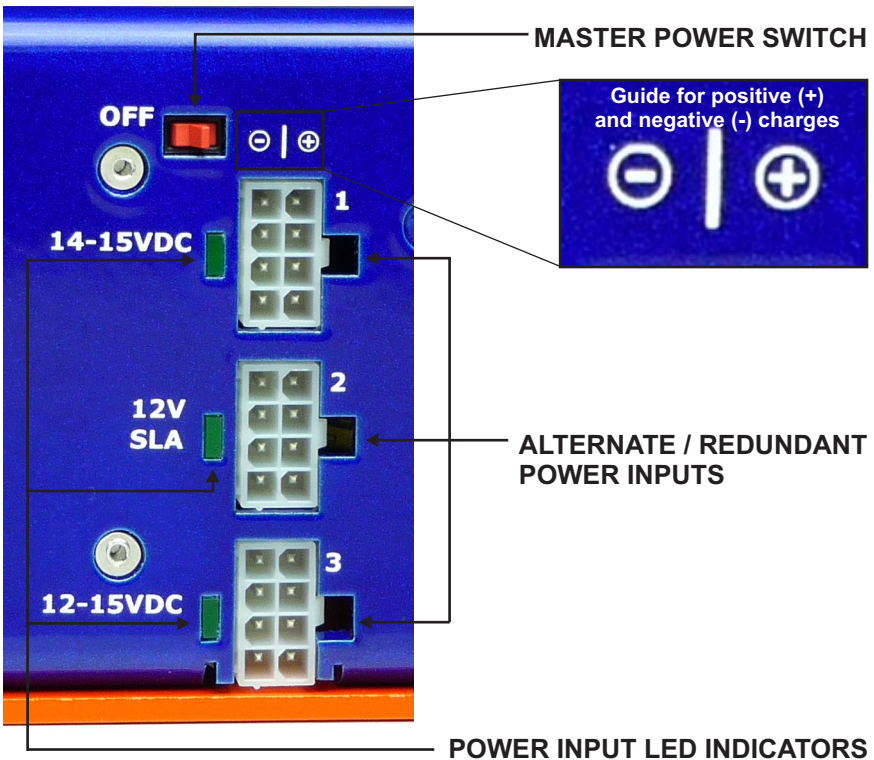
Redundant Power Inputs

OVERVIEW

The USC10M3 has four power inputs available on its back panel: a standard AC inlet with switch; a 14-15VDC inlet suitable for connecting to an external AC/DC adapter; a 12V inlet suitable for connecting a sealed lead acid (SLA) battery; and a general purpose 12-15V DC inlet.

The unit's redundant power capabilities may reduce costs as well as simplify maintenance and deployment by removing the need for a bulky UPS. Removing the UPS reduces the installation's overall footprint, as well as minimizing heat generation and power loss. With an installation using a traditional UPS, the power goes through several conversions, with power lost and heat generated at every step: AC to DC going into the UPS; DC to AC leaving the UPS.

Instead of using a UPS, the USC10M3 may be connected directly to the



standard AC power source and through a separate power inlet to a 12V SLA battery, with no need for any AC/DC or DC/AC conversions from battery to appliance or vice versa. Since the USC10M3 has multiple power inputs, replacing the battery is simple, with no need to power down the appliance.

Operational hold times during an AC power outage may be increased through the use of larger batteries. In the event of a prolonged power outage, SLA batteries may be swapped between two of the DC power inputs to extend the unit's operational up time as needed (see Acceptable Power Sources on page 27 and Acceptable Power Configurations on Page 28).

AUTOMATIC SWITCHING BETWEEN POWER SOURCES

The redundant power switching system detects and monitors the power availability on all inputs, allowing for automatic switching between power sources should the primary power source fail. For example, if the standard AC inlet is connected to an AC power source and input #2 is connected to a 12V SLA battery, should AC power fail, the unit will automatically switch over to drawing power from the battery. Once AC power is restored and stable, the unit will automatically switch back to the AC power source.

AUTOMATIC SAFE SHUTDOWN

If the battery connected to the unit starts to drop below acceptable voltage levels and no other power sources are available, the system will automatically detect this undervoltage condition and safely prepare the unit for shut down. By doing so, the unit avoids the possible data loss or data corruption that may result from an abrupt loss of power and resulting abrupt shutdown.

After initiating the safe shutdown sequence, the unit will process and store the data currently in its buffers, engage bypass on all ports (except ports configured for management). Then the unit will sit and wait in standby mode, until one of two conditions occurs:

1. If the battery is no longer able to provide enough power to maintain the unit in standby mode, it will shut down completely;
2. If AC power is restored/connected or an alternate power source connected to one of the other redundant power inputs, and the power supply is stable for 15 seconds, the unit will return to normal

ACCEPTABLE POWER SOURCES

Standard AC inlet with switch	<p>Standard AC power source (90 ~ 264 VAC, 47 Hz ~ 63 Hz) using a standard three-prong power cable. Please note that the power cord supplied in the box with the USC10M3 has a clip that ensures the cable remains firmly connected to the AC power inlet.</p>
Input #1: 14-15VDC	<p>External AC/DC power adapter, 14-15V. IMPORTANT! Do not connect power to Input #1 if using the standard AC inlet. Doing so will void the Limited Warranty and may cause damage to the unit.</p>
Input #2: 12V SLA	<p>12V sealed lead-acid battery that accepts a floating charge voltage of 13.5V, not less than 18Ah but preferably 30Ah or more.</p> <p>Recommended battery: LC-R1233P (this battery capacity will provide roughly 2 hours of hold time, depending on the battery's age, condition and other factors).</p> <p>The length of time a battery will be able to keep the unit operational depends on the capacity of the battery. The relationship between an increase in capacity and the resulting hold time is not linear, but actually increases exponentially, so a doubling in battery capacity will more than double the hold time.</p> <p>IMPORTANT! DO NOT USE DEAD OR NEARLY DEPLETED BATTERIES.</p> <p>In deciding which battery size to use, keep in mind that as batteries age their useful capacity diminishes. It is recommended to use a large capacity battery and replace it every 3-5 years or as recommended by the battery manufacturer.</p> <p>You may connect a non-battery 12V DC power source to this input, however, <u>NOT if either the standard AC inlet or Input #1 are connected to power. Doing so will void the Limited Warranty and may cause damage to the unit.</u></p>
Input #3: 12-15VDC	<p>External AC/DC 12-15V power adapter; 12V sealed lead acid battery (see #2 for requirements and recommendations).</p>

ACCEPTABLE POWER CONFIGURATIONS

Standard AC Inlet	Input #1	Input #2	Input #3	
X		X*	X	OK - *battery only
	X	X*	X	OK - *battery only
		X**	X	OK - **either battery or non-battery 12V DC power source
		X**		OK - **either battery or non-battery 12V DC power source
	X	X*		OK - *battery only
	X			OK
			X	OK
X				OK
X			X	OK
	X		X	OK
X	X			NOT ACCEPTABLE - this power configuration will void the Limited Warranty and may cause damage to the unit. DO NOT CONCURRENTLY CONNECT THE STANDARD AC INLET AND INPUT #1 TO POWER.

**** While you may connect a non-battery 12V DC power source to Input #2, this can only be done if neither the standard AC inlet nor Input #1 are connected to a power source. IMPORTANT! DO NOT CONNECT A NON-BATTERY DC POWER SOURCE TO INPUT #2 IF EITHER THE STANDARD AC INLET OR INPUT #1 ARE POWERED. Doing so may cause damage to the unit and will void the Limited Warranty.**

operations and log that power was restored.

Please note that if too small of a battery is connected (e.g. 8Ah or less), the unit may not be able to initiate the shutdown sequence in time because the battery may drain too fast for the sequence to complete. This situation could cause substantial data corruption, therefore, we recommend using a battery of at least 18Ah but preferably 30Ah or more. The larger battery size provides a more gradual depletion rate, allowing enough time for a safe shutdown when an undervoltage situation occurs.

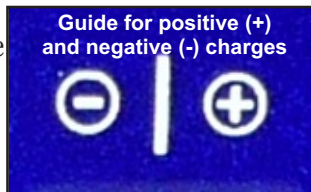
CONNECTING POWER SOURCES; CONNECTOR TYPE; WIRE LENGTH & GAUGE

Connect the standard AC power inlet to power using a standard AC power cord with three prongs. Please note that the power cord supplied in the box with the USC10M3 has a clip to ensure the cable remains firmly connected to the inlet.

For power inputs #1, #2 and #3, use 8-position Mini-Fit Jr 5557 connectors. For the individual power terminals, we recommend using at least 16 or 18 AWG copper wire. When using 3-ft length 16 AWG copper wire the loss is approximately 0.5% (the voltage loss is converted into heat). At six feet the loss increases to approximately 1% and we recommend limiting the wire length when using 16 AWG to no more than 6 feet. When using 18 AWG copper wire, the losses are higher: at three feet the loss is approximately 0.75%, while at six feet the loss is approximately 1.5%. When using 18AWG wire, we recommend a wire length of no more than 3 feet.

If you use higher-gauge copper wire you may increase the length of the wire. For example, when using 6 AWG copper wire, the wires may extend to 12 feet in length, while with 8AWG no more than 9 feet is recommended.

When connecting your power sources to power inputs #1, #2 and #3, extreme care must be taken not to reverse the polarity, i.e., positive (+) and negative (-) positions. **Improperly connecting the positive and negative power will void the Limited Warranty** and may irrecoverably damage both the USC10M3 appliance and the power source (battery or other power equipment). A visual guide for the power inputs' polarity is printed on the back panel of the USC10M3, above the three redundant power inputs (see picture at right).



POWER-INPUT LED INDICATORS

The LED indicators next to each redundant power input do not indicate which power source is currently in use. Rather, the LEDs indicate whether power is available and properly functioning (i.e., stable and of acceptable voltage).

The LED for Input #1 illuminates in two conditions: 1) if AC power is available via the standard AC inlet, or 2) if DC power is available via Input #1. **DO NOT CONNECT INPUT #1 TO POWER IF THE LED FOR INPUT #1 IS ALREADY ILLUMINATED!** Connecting both the standard AC inlet and Input #1 to power at the same time may damage the unit and will void the limited warranty.

The LED for Input #2 will also illuminate if power is available to charge a battery, even if no battery is connected.

The LED for Input #3 only illuminates when a valid power source is connected to Input #3.

BATTERY CHARGING

If AC power is available via the standard AC power inlet, power is available to charge a battery connected to power input #2. The system charges at a trickle rate, so if the battery is completely depleted it may take several hours or several days to fully charge (depending on the size of the battery). A good rule of thumb would be to allow 20 hours of charging for every hour of discharging. *This 1/20 discharge/charge ratio means care must be taken in managing power events, to make sure the appliance is not connected to a dead or nearly depleted battery when AC power fails.*

If you anticipate needing to use the battery power soon, it would be advisable to charge the battery separately, using a battery charger and then reconnecting, or connecting a different, fully charged battery to power input #2.

If you experience frequent power interruptions, it is highly recommended that you use larger-capacity batteries and have fully-charged backup batteries available.

Only power input #2 is capable of charging a battery. While you may connect a battery to power input #3, this slot will not re-charge a battery even if AC

power is restored. Any battery connected to power input #3 must be disconnected and separately recharged.

IMPORTANT! DO NOT CONNECT DEPLETED OR DEAD BATTERIES TO EITHER POWER INPUT #2 or #3. FOR BEST RESULTS, ONLY CONNECT FULLY CHARGED BATTERIES OF AT LEAST 18Ah (30Ah OR MORE IS RECOMMENDED).

CONDITIONS TO AVOID

1. Master Power Switch OFF when AC Power Is ON. The small switch above the redundant power inputs is the Master Power Switch and controls whether power is supplied to the other components of the system, while the AC power switch only controls the input of power from the standard AC inlet. When the AC switch is ON, but the Master Power Switch OFF, power inputs #1 and #2 are powered and a battery connected to input #2 would be charging, however, the unit would not boot up because no power would be supplied to the system's other components. Do not leave the appliance in this mode, with the Master Power Switch OFF and the AC switch ON because it may overheat the appliance and cause damage; in this condition the system would be under power and generating heat, however, only one fan would be running. **Leaving the Master Power Switch in the OFF position and the AC power switch in the ON position when AC power is available will void the Limited Warranty. It may overheat the appliance and cause damage.**

2. Dead or Nearly Depleted Battery. Do not connect a dead or nearly depleted battery to the appliance. While the USC10M3 may slowly recharge a discharged battery, if you have a dead or nearly depleted battery connected to the appliance and an AC power outage occurs, the battery will not be able to provide any operational hold time and the appliance will experience an abrupt power loss and shutdown, with data corruption as a possible result. If you have unstable power (for example, due to a storm) and a dead or nearly depleted battery, it would be better to shut the unit down and disconnect it from all power sources until AC power has stabilized or connect a fully charged battery.

3. Unstable / Oscillating AC Power. If you have a period of unstable AC power or power that repeatedly oscillates, the power supply and other components may become damaged. **The Limited Warranty does not cover damage caused by unstable, improperly grounded or otherwise**

unsuitable power sources. In such a situation, the appliance may become damaged or it may enter an unpredictable state requiring the appliance to be manually removed from all power sources for several minutes before being re-connected to power and re-booted.

If you are experiencing a period of unstable power, it would be best to either power down the unit and disconnect it from power entirely for the duration until AC power stability has been restored; disconnect the unit from AC power and connect to fully charged batteries for the duration; or disconnect the unit from AC power and connect to a stable DC power source. A worst case scenario would be to have a dead or nearly depleted battery and oscillating AC power; such a condition will damage both the battery and the appliance.

4. Both Standard AC Inlet and Input #1 Powered. DO NOT CONNECT BOTH THE STANDARD AC INLET AND INPUT #1 AT THE SAME TIME. This will void the Limited Warranty and may cause damage the appliance.

5. Standard AC Inlet Powered and Input #2 Connected to Non-Battery DC Power Source. DO NOT CONNECT INPUT #2 TO A NON-BATTERY DC POWER SOURCE WHEN THE STANDARD AC INLET IS CONNECTED TO POWER. Doing this will void the Limited Warranty and may cause damage to the unit.

If you would like to connect a non-battery DC power source to Input #2, neither the standard AC inlet nor input #1 may be connected to power.

6. Input #1 Powered and Input #2 Connected to Non-Battery DC Power Source. DO NOT CONNECT INPUT #2 TO A NON-BATTERY DC POWER SOURCE WHEN INPUT #1 IS CONNECTED TO POWER. Doing this will void the Limited Warranty and may cause damage to the unit.

If you would like to connect a non-battery DC power source to Input #2, neither the standard AC inlet nor input #1 may be connected to power.

Other Features and Functions

RETRIEVING DATA / RETRIEVE MODE

Data may only be retrieved from the USC10M3 using the appliance's management utility (specifically, the copy of the utility that came in the box with the unit). For more information on the management utility, see page 35.

The unit must be in retrieve mode in order to retrieve data. If the appliance is not in retrieve mode, it will not answer any attempts at communication from the management utility. When the appliance is in retrieve mode, the green RET indicator light on the front panel illuminates. To switch the unit into retrieve mode, press the retrieve button on the front panel.

Out of the box, the USC10M3 boots up with retrieve mode OFF, however, through the management utility you may elect to have retrieve mode either ON or OFF by default. If you choose to have retrieve mode on by default, the unit will boot up in retrieve mode and pressing the retrieve button will turn retrieve mode off. Regardless of retrieval status at shutdown, at bootup the unit will revert to the chosen default setting.

By default the management utility downloads the data from all ports. It may not, however, be desirable to have the data from all ports combined. When downloading data, the user may specify the specific port(s) whose activity is desired. Filters may be applied to data downloads, including date and time range, IP address and MAC address. The data may be broken into separate files instead of combined in one large file.

CONTINUOUS LOOP STORAGE (OVERWRITE)

The USC10M3 features continuous-loop storage with overwrite. Once the unit's storage has been fully utilized, it will overwrite the oldest captured data with the newest. When this occurs, the overwritten data become irrecoverable. To avoid losing important data, we advise downloading data on a regular basis. The unit also keeps an internal event log. The event log data is overwritten as the corresponding captured data, date- and time-wise, is overwritten.

If you require a packet capture appliance that does not overwrite data, forensic-class units are available which permanently record to lossless storage.

FLOW CONTROL

The USC10M3 is equipped with optional automatic flow control. Flow control may be enabled and disabled for each port individually via the management utility. When flow control is enabled, in situations where the unit is operating inline and it appears that it may run out of buffer space, the unit may ask the network counter-party to hold traffic for a short period of time, if it can, to allow the unit to catch up and free up some buffer space. This, however, is typically not necessary due to the USC10M3's high speed and large buffer.

When flow control is enabled, the unit will both accept and generate flow control packets, both responding to and generating requests to pause or resume transmissions to reduce the potential for dropped packets. While this capability may be useful in some situations, it is more secure to keep flow control disabled, as it would create a possibility for attackers to manipulate network traffic by introducing fake flow control packets (the attacker, however, would typically already have to have a foothold in the network in order to do this, since flow control packets are not intended to leave the LAN).

Flow control packets typically do not affect network traffic analysis, however, they do add to the overall traffic volume. We generally recommend not using flow control unless there is a particular reason to do so.

AUTO-NEGOTIATION (PORT SPEED)

All ports on the USC10M3 auto-negotiate their speed to match the speed of the adjacent network equipment.

POWER BUTTON SETTINGS

By default, the power button initiates the shutdown sequence (see page 16). Through the utility you may change the power button's function to reboot. In this case, pressing the power button initiates a reboot and you would then flip the back power switch after the REC, RET and port lights turn off (see page 15). **WARNING! ONLY SET THE POWER BUTTON FUNCTION TO REBOOT IF YOU INTEND TO KEEP THE UNIT ALWAYS OPERATIONAL. IT IS NOT ADVISABLE TO TURN OFF THE UNIT BY INITIATING REBOOT AND THEN FLIPPING THE BACK POWER SWITCH AS THIS MAY RESULT IN DATA LOSS OR CORRUPTION.**

Management Utility

OVERVIEW

The USC10M3's management utility is an easy-to-use menu-driven interface for securely communicating with the unit. Each USC10M3 comes in the box with a specific utility executable "mated" to the particular unit with which it came. The USC10M3 utilities are not interchangeable; an individual USC10M3 may only be accessed by the specific utility with which it came. You may find the utility for your unit located on the white USB stick that came with your unit – look for the executable named IPCD10M3_[your unit's serial number].exe.

The management utility is the only interface available for communicating with your unit, therefore we recommend that you keep a copy of your USC10M3's management utility in a safe place.

Using the management utility is very straightforward, very much like a simple question and answer session. Please visit our website at www.ipcopper.com to view videos demonstrating the menu-driven management utility. The utility may be customized to fit the particular needs of your organization. For more information, please contact us at 1-855-347-8074 or sales@ipcopper.com.

HOW THE UTILITY COMMUNICATES WITH THE UNIT

The USC10M3's management utility utilizes two protocols for communicating with the unit. For status checks and configuration changes the utility uses UDP; for data downloads the utility uses TCP/IP. To the casual observer it may not be entirely obvious what the management packets are for; for example, the management utility's UDP traffic for status checks and configuration changes look like pings.

Before initiating a session with the unit, the utility will ask you which UDP port and which TCP/IP port to use. These may be any port of your choosing, however, if you are accessing the unit via the internet from a remote location and the unit is located behind a firewall with restrictive settings, it may be advisable to open specific UDP and TCP/IP ports on the firewall so that it will allow the management traffic for the USC10M3 through.

```
IPCopper USC10G4 Management Utility v2.07
IPCopper (TM) (R) USC10G4 Tool for windows Version 2.07 (ser:TEST)
copyright (c) IPCopper, Inc. 2014. All rights reserved.

1. Check Status.
2. Download Data.
3. Change settings.
4. Change passcodes.
5. Reboot IPCopper.
6. Reset all ports to InLine.
What would you like to do? Check Status.
Would you like to use this IP address 192.168.0.9? (Y)es/(n)o: Yes.
Would you like to use this port 33178? (Y)es/(n)o: Yes.
Would you like to use this port 80? (Y)es/(n)o: Yes.
Please enter your passcode (if blank press Enter):
Is the "REC" light on your IPCopper unit illuminated? (Y)es/(n)o: Yes.
Is the "RET" light on your IPCopper unit illuminated? (Y)es/(n)o: _
```

Launching the utility gives you a menu of six options. In the example at left, the user chose Check Status, after which the system asked for the IP address and ports with which to connect to the unit.

**Screenshots may be from the USC10G4, however, its operation is identical to the USC10M2 utility.*

INSTALLING AND LAUNCHING THE UTILITY

To install the management utility on a computer, first locate the white USB stick that came with your USC10M3 packet capture appliance.

1. Insert the white USB stick into the computer's USB drive.
2. Open the USB drive and locate the executable file named IPCD10M3_[your unit's serial number].exe. Copy the executable file to a folder of your choice on the computer.

To launch the IPCD10M3 management utility:

1. Launch the executable file named IPCD10M3_[your unit's serial number].exe by double-clicking on it.
2. The application will launch a command prompt window. When prompted, select the desired action from the menu of choices, for example, to check status, download data, change settings, change passcodes, reboot IPCopper* or reset all ports to inline.
3. After you make your selection, the utility will ask a series of questions to determine how to access the unit, including which IP address to use (see screenshot above).

** If you must reboot your USC10M3, it is preferable to do so via the management utility. Pressing the reboot button on the front panel causes an abrupt reboot which may result in data loss or corruption, while rebooting through the management utility initiates a "soft" reboot that minimizes the chances for data loss or corruption.*

SELECTING AN IP ADDRESS FOR ACCESSING THE UNIT

While the USC10M3 typically does not have an IP address (unless a port in management mode has been given one manually), the management utility can connect to the unit by sending communications intended for the unit along a network route that traverses the unit. For example, if the computer you are using is on one side of the USC10M3 and another computer or other network equipment is located on the other side of the unit, you may enter that other equipment's IP address when asked by the management utility.

If you intend to access the USC10M3 from a remote location, it may be necessary to open specific UDP and TCP/IP ports on the firewall at the USC10M3's location, so that the management traffic from the utility at the remote location will be allowed through and sent along the appropriate network route to traverse the unit (for more on how the management utility communicates with the unit, please see page 35). Please see the next section, **ACCESSING IPCOPPER FROM A REMOTE LOCATION** on page 39, for more information on choosing an IP address when the unit is in a separate location than the utility.

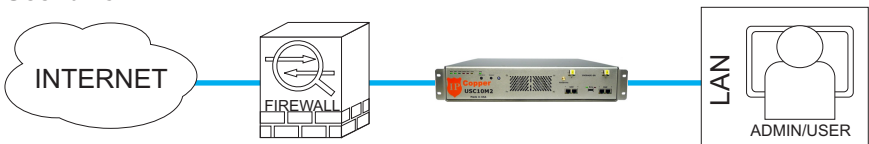
If you are not sure which IP address to use answer “no” when the utility asks you if you would like to use a particular IP address (see screenshot on previous page: “Would you like to use this IP address 192.168.0.9?”). The utility will then ask a series of questions to help you determine which IP address to use.

Below are a few scenarios for accessing the IPCopper unit.

Scenario 1.



Scenario 2.



In both scenarios illustrated above IPCopper is located inline on the wire, in one case between the firewall and the internet and in the other case between the firewall and the LAN. In either case, using an IP address from the public internet would cause the management packets to pass through the unit.

Scenario 3.



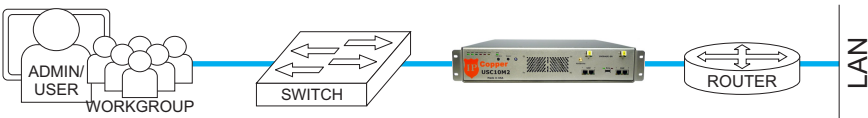
In this scenario, the USC10M2 is placed further inside the network, inline between a workgroup's router and the rest of the LAN. To access IPCopper from a computer located in a different part of the LAN, use the IP address of the router.

Scenario 4.



In this scenario, the USC10M2 is placed further inside the network, inline between a workgroup's router and the rest of the LAN. To access the unit from a computer within the workgroup, you may use the IP address of any LAN equipment on the other side of IPCopper or an IP address from the public internet.

Scenario 5.



In this scenario, the USC10M2 is placed inline between a workgroup's switch and the rest of the LAN. To access the unit from a computer within the workgroup, you may use the IP address of any equipment on the other side of IPCopper, for example, the router, or an IP address from the public internet.

Scenario 5.



In this scenario, the USC10M2 is placed inline between a workgroup's switch and the rest of the LAN. To access the unit from a different part of the LAN, use the IP address of one of the computers in the workgroup.

Scenario 7.



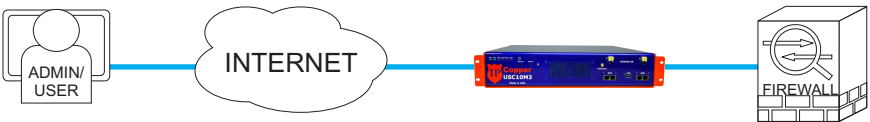
In this scenario, the USC10M2 is placed inline between a database or other type of server. To access IPCopper, use the IP address of the database/server.

ACCESSING IPCOPPER FROM A REMOTE LOCATION

Depending on where the USC10M3 is located, when accessing the unit from a remote location, it may be necessary to open specific UDP and TCP/IP ports on the firewall at the USC10M3's location, so that the management traffic from the utility at the remote location will be allowed through and sent along the appropriate network route to traverse the unit (for more on how the management utility communicates with the unit, please see page 35).

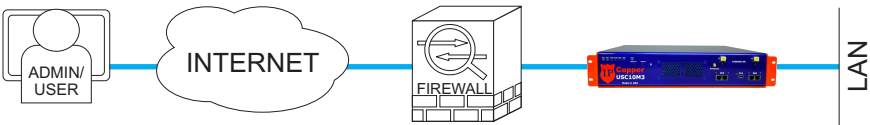
The scenarios above provide guidance on selecting an IP address for accessing the USC10M3 when the utility is not at the same location as the unit.

Scenario 1.



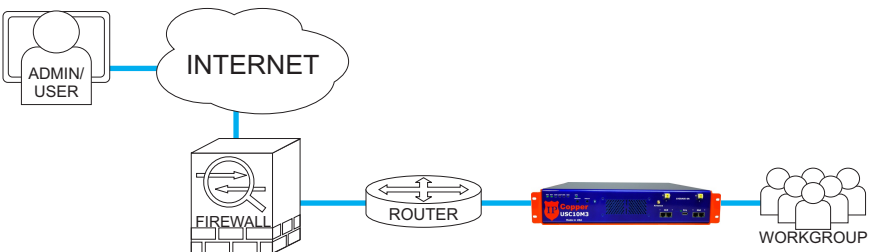
In this scenario, the USC10M3 is placed at the network perimeter, inline between the internet connection and the firewall. To access the IPCopper unit remotely, the admin/user would use the IP address of the firewall located on the other side of the unit.

Scenario 2.



In this scenario, the USC10M3 is placed almost at the network perimeter, inline between the firewall and the LAN. To access the IPCopper unit remotely, the admin/user would use the IP address of the network equipment located inside the LAN, on the opposite side of IPCopper from the firewall. In this scenario, it may be necessary to open specific UDP and TCP/IP ports on the firewall, so that management packets would be allowed through to traverse the IPCopper unit.

Scenario 2.



In this scenario, the USC10M3 is placed inside the LAN, in between a router and a workgroup. To access the unit, the admin/user would use the IP address of a member of the workgroup. In this scenario it may be necessary to open specific UDP and TCP/IP ports on the firewall, so that management packets would be allowed through to traverse the IPCopper unit.

ADMIN AND USER PASSWORDS

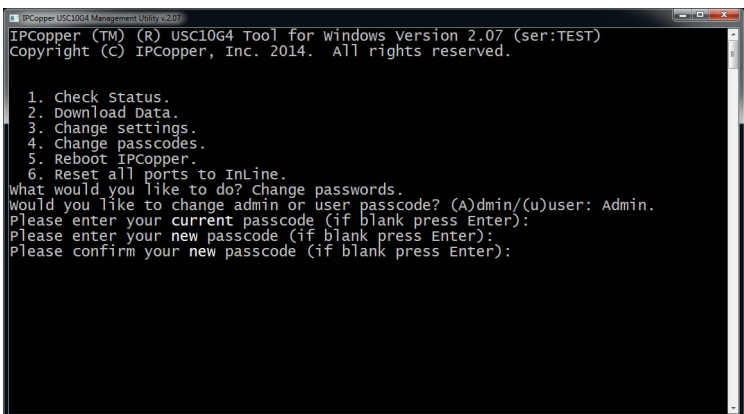
Out of the box, both admin and user passwords are blank by default. Only the admin can change passwords. Passwords are limited to a length of 12 characters, and should conform to hex-decimal format (you may use any number from 0 - 9 and any letter from A - F).

IMPORTANT! Do not lose the admin password. To reset the admin password requires physical access to the unit and it would be necessary to contact IPCopper tech support for assistance. IPCopper tech support would not be able to remotely reset the password, however, they can provide specific instructions on how to reset the password. This process may require a firmware upgrade. *Please note it may be necessary to send the unit to IPCopper tech support to have the password reset.*

When checking status, retrieving data or changing settings, the interface will prompt the user for a password. The unit will check the entered password against those set for the admin and user and grant privileges for that session based on which one it matches. Please note that if the password entered matches neither admin nor user, the unit will not respond. This is a security feature to protect the unit against brute force attacks. Should you enter the incorrect password, you will need to relaunch the management utility and start over.

Entry of the admin password allows the user to change any settings, including the passwords for both admin and user, as well as to run status checks and data downloads. Only the admin is able to change settings and passwords.

Changing the admin passcode.



```
IPCopper (TM) (R) USC10G4 Tool for Windows version 2.07 (ser:TEST)
Copyright (C) IPCopper, Inc. 2014. All rights reserved.

1. Check Status.
2. Download Data.
3. Change settings.
4. Change passcodes.
5. Reboot IPCopper.
6. Reset all ports to InLine.
What would you like to do? Change passcodes.
would you like to change admin or user passcode? (A)dmin/(u)user: Admin.
Please enter your current passcode (if blank press Enter):
Please enter your new passcode (if blank press Enter):
Please confirm your new passcode (if blank press Enter):
```


Entry of the user password only allows status checks, unless the admin has data download privileges.

CHANGING PASSWORDS

Please note that only the admin can change passcodes. Out of the box both admin and user passcodes are blank. Once you change the admin passcode to a nonblank code you must also change the user passcode to a nonblank code. To change either the admin or user passwords, launch the management utility.

1. Enter “4” to select Change passcodes from the menu of options.
2. The utility will first lead you through a series of questions to determine how best to communicate with the unit (see “SELECTING AN IP ADDRESS FOR ACCESSING THE UNIT” on page 28).
3. When prompted, enter “a” to change the admin passcode or “u” to enter the user passcode.
4. When prompted, enter the admin passcode.
5. When prompted, enter the new passcode. Passwords are limited to a length of 12 characters, and should conform to hex-decimal format (i.e., you may use any number 0 - 9 and any letter A - F).
6. When prompted, re-enter the new passcode to confirm the change.

IMPORTANT! Do not lose the admin password. To reset the admin password requires physical access to the unit and it would be necessary to contact IPCopper tech support for assistance. IPCopper tech support would not be able to remotely reset the password, however, they can provide specific instructions on how to reset the password. This process may require a firmware upgrade. *Please note that it may be necessary to send the unit to IPCopper tech support to have the password reset.*

STATUS PAGE

To check the status of your USC10M3 unit, launch the management utility (IPCD10M3_[your unit's serial number].exe) and select Check Status from the menu of options. The utility will lead you through a series of questions to determine how best to communicate with the unit (see “SELECTING AN IP ADDRESS FOR ACCESSING THE UNIT” on page 28), then retrieve the status

```

IPcopper USC10G4 Management Utility v2.07
HDD Capacity :24.004 TB Used :0.0178% Recv: 0bps / 0p
Retrieve :On Download :On Mode: InLine CTRL
FastGPS :On SyncGPS :On
Overwrite :Off GPS :Sync ok
Unit's Name :
Location :
Management IP : 3.176.193.74 / off
Management MAC : A5-A6-08-50-98-24 / off
Temperature °C : 58 40 33 36 39 12.06v
Fan Speed RPM : 2200 3600 2200
IRQ : 0.000/ 0.000
Buffers (% used) : 0 0 0 0 25
HDD : 0.000 Gbps
Load CPUs : 0.016% 0.001% 0.000%
Drops & Errors : 0 0 0 0
IPC Current Date : 12-11-2014 02:08:36.049 GMT
Local Date : 12-11-2014 02:08:52.594 GMT
IPC Boot Date : 12-11-2014 02:01:40 GMT
Up Time : 6 mins 55 secs
Indexed :
Indexed :
Indexed :
1. Port1 is up @ 1Gbps FD.
Recv: 0bps / 0p
Mode: InLine CTRL
2. Port2 is down.
Recv: 0bps / 0p
Mode: InLine CTRL
3. Port3 is down.
Recv: 0bps / 0p
Mode: InLine CTRL
4. Port4 is down.
Recv: 0bps / 0p
Mode: InLine CTRL
5. Port5 is down.
Recv: 0bps / 0p
Mode: InLine CTRL
6. Port6 is down.
Recv: 0bps / 0p
Mode: InLine CTRL
Enter 1-6 for port details/(U)pdate/(A)utoUpdate/(Q)uit:

```

The status page displays the unit's current settings and performance statistics, as well as the status of the individual ports. Entering an individual port number will provide additional port statistics.

information from the USC10M3.

Running a status check yields a status page with a number of statistics on the functioning and operations of the unit (see screenshot below). Much of the information on the status page is diagnostic in nature, and is there in case the unit malfunctions and IPCopper personnel need to diagnose the problem. For security reasons, IPCopper personnel have no facilities to remotely connect to your IPCopper unit.

- **HDD Capacity:** Indicates unit's total hard drive capacity. The percentage indicates how much has been used.
- **Retrieve:** Indicates whether unit has been set to boot up with retrieve mode ON or OFF.
- **Download:** Indicates whether user has been granted data download privileges.
- **FastGPS and SyncGPS:** Indicate the unit's current GPS synchronization settings. If SyncGPS is OFF, GPS time synchronization has been disabled and the unit will not synchronize its time to GPS time at bootup. For more information, please see "GPS Time Synchronization" on page 17.
- **GPS:** Indicates the outcome of the last time the unit attempted to synchronize its time to GPS time. "Sync ok" indicates that the most recent GPS time synchronization attempt was successful.
- **Overwrite status:** If OFF, the unit is still on its first loop of recording, has not yet reached capacity and is not yet overwriting any data. If this indicator is ON, it means that the unit is beyond the first recording

loop and is now overwriting the oldest data with the newest. Once overwrite is on, the utilization percentages indicate the percentage that has been recorded since the end of the last “lap.” For example, if overwrite is off and utilization is 5%, only 5% of capacity has been utilized. If overwrite is on and utilization is 5%, 100% of capacity has been utilized, however, 5% of that has taken place since the beginning of the current loop.

- **Unit Name and Location:** These are user-designatable IDs. They are informational only, for convenience in managing multiple IPCopper units and have no bearing on the unit’s or the utility’s operations.
- **Indexed data:** The status page shows indexed data, that is, data that has already been indexed. The USC10M3 automatically indexes the data as it records it, however, under normal operations there is always a slight lag between the last indexed date and time and the current date and time. Normally you should see only one big index covering an entire, continuous time period, however, it is rare but possible to have additional indexed periods with other time intervals. This circumstance should not occur as long as GPS time synchronization is used to ensure that the unit’s clock keeps counting forward in time.
- **Drops and Errors:** The first number refers to packets that were received properly but not stored, either because it was received on a port in a mode that does not record data or because it was dropped intentionally to avoid data corruption due to data overload. The second number refers to packets that the unit attempted but was unable to store due to running out of buffer space, most likely caused by excessive throughput or a malfunction. The third number refers to packets that were received on a port in inline mode that the unit was unable to transmit out through the companion port due to running out of buffer space and were therefore not recorded (to ensure data coherency for data retrieval, the unit drops the packet in this situation). This situation could be triggered by a retrieval request occurring at a time when the unit is operating at close to the rated load or during times of excessive load. The unit has been designed and tested to peak at 10 Gbps, however, those peaks generally can only be sustained for short period of time. The fourth number refers to packet retrieval errors, which occur when retrieval requests fail due to a checksum failure for a chunk of data. The unit was able to detect

that there was data stored but was unable to retrieve it to due CRC error or a failure to decrypt.

The right-hand column gives the status of the individual ports. For more information on an individual port, enter the desired port number (1 - 6).

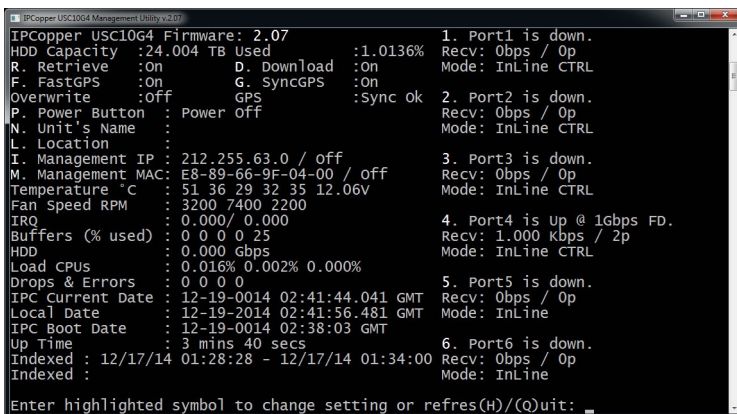
To update the status page, enter “u” to update once. You may also choose to set the utility to check and update the status every one to sixty minutes by entering “a,” then entering the number of minutes desired between status checks.

CHANGING SETTINGS

To change any settings other than admin and user passcodes, launch the management utility and select option 3. Change Settings from the main menu. This will bring up a screen very similar to the Check Status screen, but with codes for the changeable settings highlighted (see screenshot below).

- R: Change the boot setting for retrieve mode. If Retrieve is ON, the unit will boot up with retrieve mode turned on.
- F: Change the FastGPS setting. If ON, the unit will use the FastGPS option for GPS time synchronization; if OFF, unit will use the standard GPS time synchronization process (please see GPS Time Synchronization on page 17).
- P: Change power button settings. If “Power off,” the power button will initiate the shutdown sequence; if “Reboot,” pressing the power button reboots the unit (please see “Shutdown Sequence” on page 16 and

Pressing the associated key for a setting that is either ON or OFF toggles its value. For other settings you will be asked to enter a specific value at the bottom of the screen.



```
IPCopper USC10G4 Management Utility v2.07
HDD Capacity : 24.004 TB Used      : 1.0136%
R. Retrieve   : On                D. Download : On
F. FastGPS    : On                G. SyncGPS  : On
Overwrite     : off              GPS         : Sync ok
P. Power Button : Power off
N. Unit's Name :
L. Location    :
I. Management IP : 212.255.63.0 / off
M. Management MAC : E8-89-66-9F-04-00 / off
Temperature °C : 51 36 29 32 35 12.06V
Fan Speed RPM  : 3200 7400 2200
IRQ            : 0.000/ 0.000
Buffers (% used) : 0 0 0 0 25
HDD            : 0.000 Gbps
Load CPU       : 0.016% 0.002% 0.000%
Drops & Errors  : 0 0 0 0
IPC Current Date : 12-19-0014 02:41:44.041 GMT
Local Date      : 12-19-2014 02:41:56.481 GMT
IPC Boot Date    : 12-19-0014 02:38:03 GMT
Up time         : 3 mins 40 secs
Indexed : 12/17/14 01:28:28 - 12/17/14 01:34:00
Indexed :
1. Port1 is down. Recv: 0bps / 0p Mode: InLine CTRL
2. Port2 is down. Recv: 0bps / 0p Mode: InLine CTRL
3. Port3 is down. Recv: 0bps / 0p Mode: InLine CTRL
4. Port4 is up @ 1Gbps FD. Recv: 1.000 Kbps / 2p Mode: InLine CTRL
5. Port5 is down. Recv: 0bps / 0p Mode: InLine
6. Port6 is down. Recv: 0bps / 0p Mode: InLine
Enter highlighted symbol to change setting or refres(H)/Quit: _
```

```

IPCopper USC10G4 Management Utility v2.07
HDD Capacity :24.004 TB Used :1.0136%
R. Retrieve :On D. Download :On
F. FastGPS :On G. SyncGPS :On
Overwrite :off GPS :Sync ok
P. Power Button : Power Off
N. Unit's Name :
L. Location :
I. Management IP : 212.255.63.0 / off
M. Management MAC: E8-89-66-9F-04-00 / off
Temperature °C : 51.36 29.32 35.12 06v
Fan Speed RPM : 3200 7400 2200
IRQ : 0.000/ 0.000
Buffers (% used) : 0 0 0 0 25
HDD : 0.000 Gbps
Load CPUs : 0.016% 0.002% 0.000%
Drops & Errors : 0 0 0
IPC Current Date : 12-19-2014 02:41:44.041 GMT
Local Date : 12-19-2014 02:41:56.481 GMT
IPC Boot Date : 12-19-2014 02:38:03 GMT
Up Time : 3 mins 40 secs
Indexed : 12/17/14 01:28:28 - 12/17/14 01:34:00
Indexed :

1. Port1 is down.
Recv: 0bps / 0p
Mode: Inline CTRL

2. Port2 is down.
Recv: 0bps / 0p
Mode: Inline CTRL

3. Port3 is down.
Recv: 0bps / 0p
Mode: Inline CTRL

4. Port4 is up @ 1Gbps FD.
Recv: 1.000 Kbps / 2p
Mode: Inline CTRL

5. Port5 is down.
Recv: 0bps / 0p
Mode: Inline

6. Port6 is down.
Recv: 0bps / 0p
Mode: Inline

Set Port5: (I)inline/(B)ypass/(S)pan/(M)anagement/(C)ontrol:

```

Pressing an individual port's number lets you change the port mode and turn the CTRL marker on and off.

“Power Button Settings” on page 25). Please note that if the power button is set to “Power off” and you initiate the shutdown sequence, the key must be present to boot the unit back up.

- N: Enter or change a user-selectable name for the unit. This setting is informational only and has no bearing on the unit's or the utility's operations.
- L: Enter or change a user-selectable location for the unit. This setting is informational only and has no bearing on the unit's or the utility's operations.
- I: Enter or change the user-selectable management IP address. Please note this IP address entry is only active when you have a port set to management mode.
- M: Enter or change the user-selectable management MAC address. Please note this MAC address entry is only active when you have a port set to management mode.
- D: Enable or disable user's ability to download data. The user can only download data from the unit if the admin grants them the privilege.
- G: Enable or disable GPS synchronization. If OFF, the unit will not go through GPS synchronization at bootup. For more information, please see “GPS Time Synchronization” on page 18.
- 1 - 6: Select the individual port for which you would like to change settings, including the port mode and the CTRL Marker status.

Entering a port number will give you the option to change that particular port's mode (to either Inline, Bypass, Span or Management) and other settings.

```
IPcopper USC10G4 Management Utility v2.07
IPcopper (TM) (R) USC10G4 Tool for windows version 2.07 (ser:TEST)
copyright (C) IPCopper, Inc. 2014. All rights reserved.

1. Check Status.
2. Download Data.
3. Change settings.
4. Change passcodes.
5. Reboot IPCopper.
6. Reset all ports to InLine.
What would you like to do? Download Data.
Enter file name for log file: log.txt
Log file "log.txt" created successfully.
Enter file name for pcap file: out.pcap
PCAP file "out.pcap" created successfully.
Would you like to store PCAP data in separate 1GB files? (N)o/(y)es: No.

1. All Data.
2. Last 60 minutes.
3. Last 12 hours.
4. Last 24 hours.
5. Last 7 days.
6. Last 30 days.
7. Last 60 days.
8. Manual Date/Time Range.
```

When downloading data, you first specify the names of the log and data files. The option to store the PCAP data in separate 1GB files is useful if your analysis software cannot handle large file sizes.

Entering “C” for Control toggles the CTRL marker on or off. Please see CTRL MARKER AND PERFORMANCE on page 17 for more information on the control marker and how enabling and disabling it affects performance. Press “F” to enable/disable flow control (see page 34).

DOWNLOADING DATA

To download data, launch the management utility and select option 2. Please note that the log file and PCAP file will be downloaded into the same folder in which the management utility executable resides.

1. The utility first prompts you to enter a name to use for the log file.
2. Next the utility asks for the name to use for the PCAP data file.
3. The utility then gives you the option of downloading the PCAP data as one file or a series of 1 GB files. Answer “no” if you want one large file

The utility will ask you to define several data retrieval parameters before initiating the download.

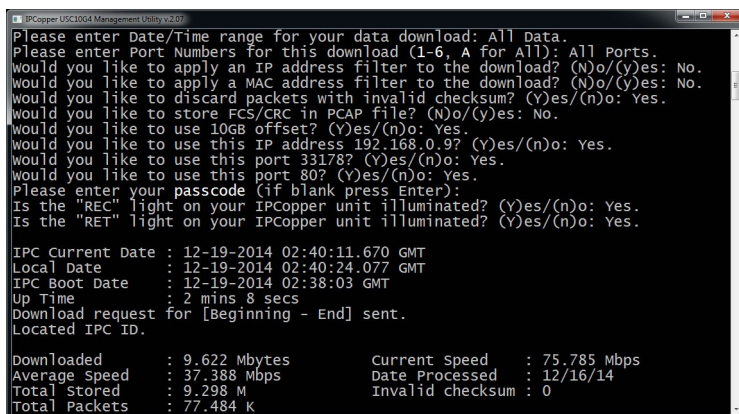
```
IPcopper USC10G4 Management Utility v2.07
Enter file name for pcap file: out.pcap
PCAP file "out.pcap" created successfully.
Would you like to store PCAP data in separate 1GB files? (N)o/(y)es: No.

1. All Data.
2. Last 60 minutes.
3. Last 12 hours.
4. Last 24 hours.
5. Last 7 days.
6. Last 30 days.
7. Last 60 days.
8. Manual Date/Time Range.
Please enter Date/Time range for your data download: All Data.
Please enter Port Numbers for this download (1-6, A for All): All Ports.
Would you like to apply an IP address filter to the download? (N)o/(y)es: No.
Would you like to apply a MAC address filter to the download? (N)o/(y)es: No.
Would you like to discard packets with invalid checksum? (Y)es/(n)o: Yes.
Would you like to store FCS/CRC in PCAP file? (N)o/(y)es: No.
Would you like to use 10GB offset? (Y)es/(n)o: Yes.
Would you like to use this IP address 192.168.0.9? (Y)es/(n)o: Yes.
Would you like to use this port 33178? (Y)es/(n)o: Yes.
Would you like to use this port 80? (Y)es/(n)o: Yes.
Please enter your passcode (if blank press Enter):
Is the "REC" light on your IPCopper unit illuminated? (Y)es/(n)o: Yes.
Is the "RET" light on your IPCopper unit illuminated? (Y)es/(n)o: Yes.
```


downloaded, “yes” to have the data downloaded in separate 1 GB chunks.

4. Choose the desired date/time range for the download. You may choose from a menu of pre-set options or enter “8” to manually select the start and end times of the data to be downloaded. The software automatically inserts the slashes and colons, using the format provided – two-digit month, day and year separated by slashes and military time for the hours, minutes and seconds, separated by colons.
5. Next the utility asks a series of questions to determine the details for the data download, including for which ports you would like to download data (you may enter an individual port number, a list of port numbers separated by spaces or A for all ports); whether you would like IP address or MAC address filters applied to the download; whether you would like to discard packets with invalid checksums (because IPCopper stores the original checksums for every packet off the wire, you have an option to include packets with invalid checksums); whether you would like to store FCS/CRC information in the PCAP file; and whether you would like to use the 10GB offset (for more information, see “Offset” on next page).
6. Lastly, the utility asks three questions about the IP address and port numbers to use to access the unit (see SELECTING AN IP ADDRESS FOR ACCESSING THE UNIT on page 37).
7. Enter your passcode when prompted.
8. Before initiating the download, the utility asks you to confirm that the

During the data download, the utility will display a number of statistics about the download, including current and average speed and total amount of data downloaded so far.



```
IPCopper USC1004 Management Utility v2.0.7.1
Please enter Date/Time range for your data download: All Data.
Please enter Port Numbers for this download (1-6, A for All): All Ports.
Would you like to apply an IP address filter to the download? (N)o/(Y)es: No.
Would you like to apply a MAC address filter to the download? (N)o/(Y)es: No.
Would you like to discard packets with invalid checksum? (Y)es/(N)o: Yes.
Would you like to store FCS/CRC in PCAP file? (N)o/(Y)es: No.
Would you like to use 10GB offset? (Y)es/(N)o: Yes.
Would you like to use this IP address 192.168.0.9? (Y)es/(N)o: Yes.
Would you like to use this port 33178? (Y)es/(N)o: Yes.
Would you like to use this port 80? (Y)es/(N)o: Yes.
Please enter your passcode (if blank press Enter):
Is the "REC" light on your IPCopper unit illuminated? (Y)es/(N)o: Yes.
Is the "RET" light on your IPCopper unit illuminated? (Y)es/(N)o: Yes.

IPC Current Date : 12-19-2014 02:40:11.670 GMT
Local Date      : 12-19-2014 02:40:24.077 GMT
IPC Boot Date   : 12-19-2014 02:38:03 GMT
Up Time        : 2 mins 8 secs
Download request for [Beginning - End] sent.
Located IPC ID.

Downloaded      : 9,622 Mbytes           Current Speed   : 75.785 Mbps
Average Speed   : 37.388 Mbps           Date Processed  : 12/16/14
Total Stored    : 9,298 M              Invalid checksum: 0
Total Packets   : 77.484 K
```

RET and REC lights on the unit are illuminated. This is to make sure that the unit is in a state where it can receive management packets. Under normal operations the REC light will be on; if it is off, there may be a connectivity or other problem that would prevent the unit from receiving management packets. The RET light indicates whether the unit is in retrieve mode – it must be in retrieve mode, indicated by illumination of the RET light, in order to recognize and act on management communications. If the RET light is off, press the retrieve button on the front panel to toggle the unit into retrieve mode.

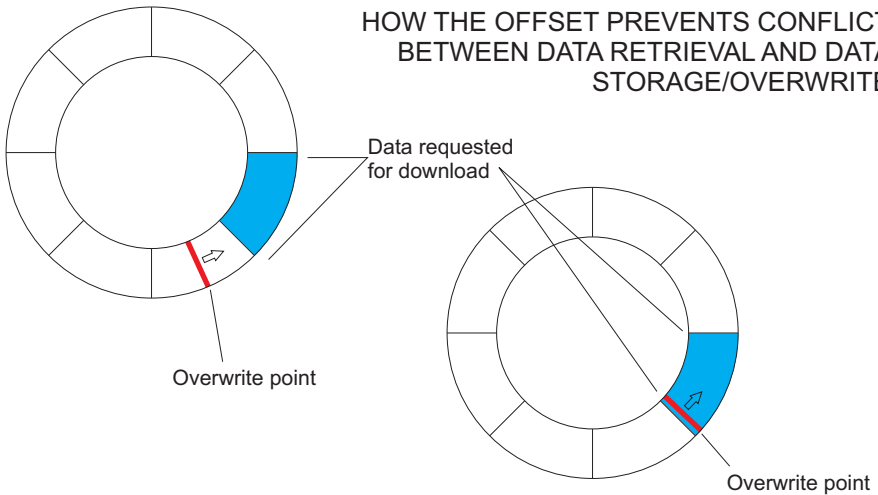
Once the utility has initiated the download it will display the progress of the request on the screen. When complete, the utility will display a number of statistics on the screen about the download, including the total amount of data downloaded, the average speed of the connection during download, the total number of packets, the date the request was processed and the quantity of packets with invalid checksums.

The utility will save the log file and the PCAP file(s) in the same folder in which the management utility executable resides.

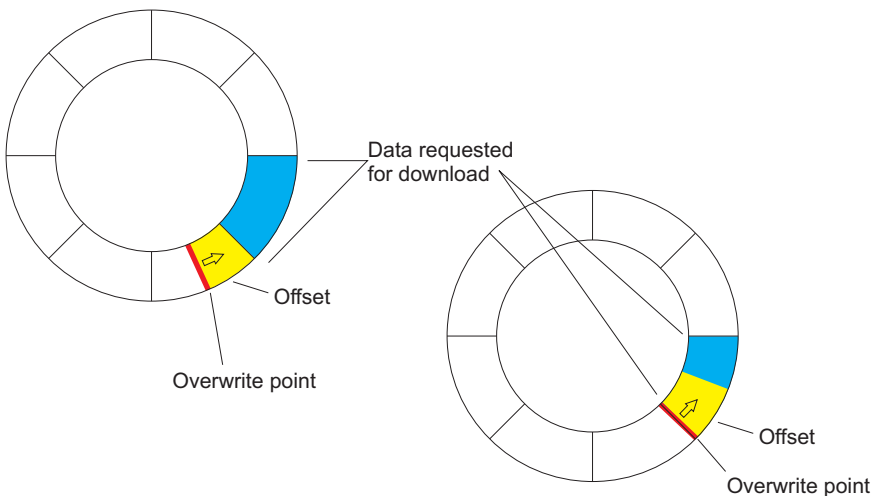
TIPS FOR RETRIEVING DATA

- **If All Ports in SPAN Mode:** When all ports are in SPAN mode, you cannot specify a management IP address during the utility's retrieval process. Instead, when prompted, answer that you do not know the IP address to use and the subsequent questions will lead you through the rest of the process.
- **Offset:** When retrieving data you may specify an "offset" in order to avoid attempting to retrieve data that is currently in the process of being overwritten. By default the offset is set to 10 GB, which means that the retrieval will not retrieve any data within 10 GB of the earliest data on the machine. In most cases 10 GB is a sufficient offset, however, if your unit is capturing and recording at higher than average speeds, then a larger offset, as much as 100 GB, may be necessary. Should you attempt to retrieve data that is in the process of being overwritten, the retrieval request will abort and you will need to start over with a new retrieval request.

HOW THE OFFSET PREVENTS CONFLICT BETWEEN DATA RETRIEVAL AND DATA STORAGE/OVERWRITE



The data retrieval request above encompasses portions of data close to the point at which the oldest data is being overwritten with the newest. During the course of the data download, the overwrite point reached the portion of the data requested for download and the data download failed.



The data retrieval request above encompasses portions of data close to the point at which the oldest data is being overwritten with the newest, however, an offset has been utilized. While processing the data retrieval request, IPCopper determines from which point the requested data starts. If that point is within the immediate overwrite zone, IPCopper will shift the beginning of the retrieval away from the immediate overwrite zone by the specified offset.

- If you need to retrieve large chunks of the earliest recorded data on the machine, to avoid running into an issue with the offset and overwrite (see previous page) it would be advisable to remove the unit from operation (i.e. disconnect it from the network) and then retrieve data via a port set to management mode. By doing this you can ensure that the unit is not capturing or overwriting any data during the retrieval process.
- Please also see CTRL MARKER AND PERFORMANCE on page 17. Ports with the CTRL marker turned off will not be able to recognize, accept or act on any management packets sent from the management utility, including data retrieval requests.

Troubleshooting

OVERVIEW

The tips below should help resolve most issues that you may experience with your IPCopper packet capture appliance, but we are here to help if you need further assistance. Even if your appliance is no longer within the warranty period, please contact us with any questions or concerns you may have about the operation of your USC10M3 at support@ipcopper.com. When contacting tech support, please include your unit's serial number, the model number and a description of the problem. You would receive an automated acknowledgment that your email was received. Most emails are answered within 24-48 business hours.

ERROR LIGHT ILLUMINATED

1. Press the reboot button to reboot the unit. In most cases this should clear the error.
2. Shut the unit down, remove from power and re-connect to power using a different power cord and different outlet, then reboot the unit.
3. Change all ethernet cables connected to the unit, then reboot.
4. Disconnect all ethernet cables, reboot the unit and observe whether the error light persists.
5. Verify that the USB key is firmly seated in its slot.
6. Verify that the correct USB key has been inserted into the unit's key slot. You should use the black USB key that came in the box with the unit. If the incorrect USB key is inserted, the unit will not boot up.

If the error light persists after several attempts to reboot the unit, changing cables and changing the power sources as suggested above, please contact IPCopper tech support for more assistance.

UNABLE TO CONNECT TO INTERNET

1. Is the error light on? If yes, see section above.

2. Check the ethernet cables to confirm that they are firmly connected at both ends. Also confirm that the unit is connected to power and that both power switches in the back are on the ON position.
3. Check for loose network cables between your computer and the unit.
4. Check the status lights on your modem, to confirm whether your internet connection is operational.
5. If the unit has just been rebooted or is booting up for the first time after a power outage, confirm that the USB key is firmly inserted in the USB slot. The USB key is necessary for the unit to boot up and if the USB key is missing, the unit will not be able to boot up.
6. Check the green and orange Ethernet port lights. If they are off, it may indicate a lack of connectivity. See points 2 and 3 above.
7. It is possible that the unit's ports are either in management mode or SPAN mode. If so, you would not be able to connect to the internet through the unit. In order to connect to the internet or other parts of the network through the unit, the unit must be in either inline or bypass modes. For more on port modes, please see page 23.

RED KEY LIGHT ILLUMINATED

1. Make sure that the USB key is firmly seated in the key slot.
2. Verify that the correct key has been used. The unit will not boot up unless the correct key is inserted. You must use the black USB key that came in the box with the unit.

After verifying and inserting the correct key, the error light will continue to blink for a short time, then turn off, after which the unit will attempt to communicate with the key and verify that it is correct (the COM light will blink).

NOTHING HAPPENS WHEN UNIT CONNECTED TO POWER, NO LIGHTS

1. Confirm that the power cord is firmly connected at both ends and the master power switch on the back is in the ON position.
2. Toggle the master power switch on the back to OFF, wait a few seconds, then toggle back to the ON position.

3. Use a different power cord and/or electrical outlet.
4. Try using a surge protector or UPS (uninterruptible power supply).
Or, if already using, try using a different one.

If none of the above makes a difference, please contact IPCopper technical support for further assistance. Please note that if you have recently experienced power fluctuations, spikes or outages, such as those due to a storm, some of the unit's internal components may have been affected. We highly recommend that IPCopper appliances always be connected to power via a surge protector or UPS for protection against power spikes, surges and other fluctuations in the electrical grid.

POWER IS CONNECTED TO THE STANDARD AC INLET BUT THE UNIT DOES NOT POWER ON

1. Confirm that the AC power cord is firmly connected at both ends, that the AC switch is in the ON position and that the master power switch on the back is in the ON position.
2. Toggle the small power switch on the back to OFF, wait a few seconds, then toggle back to the ON position. Confirm that the AC switch is ON and the AC power cord firmly connected at both ends.

WHEN CONNECTED TO POWER, ALL LIGHTS ILLUMINATE BUT UNIT DOES NOT APPEAR TO BOOT UP AND FANS "TWITCH" BUT DO NOT TURN ON

This behavior likely indicates a situation where the unit is not receiving enough power to start up. This may be due to connecting the unit to an overloaded electrical circuit or a malfunctioning UPS or there may be an issue with the ground.

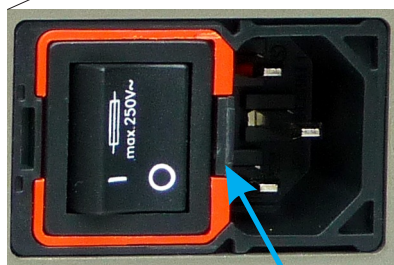
1. Confirm that the power cord is firmly connected at both ends and the master power switch on the back is in the ON position.
2. Toggle the small power switch on the back to OFF, wait a few seconds, then toggle back to the ON position.
3. If you are using AC power, confirm that the AC switch is ON and the AC power cord firmly connected at both ends.

3. Use a different power cord and/or electrical outlet (located on a different circuit).
4. Try using a surge protector or UPS (uninterruptible power supply). Or, if already using, try using a different one.

If none of the above makes a difference, please contact IPCopper technical support for further assistance. Please note that if you have recently experienced power fluctuations, spikes or outages, such as those due to a storm, some of the unit's internal components may have been affected. We highly recommend that IPCopper appliances always be connected to power via a surge protector or UPS for protection against power spikes, surges and other fluctuations in the electrical grid.

Power Supply Fuse

A replacement power fuse for the power supply may be found behind the small door in the power supply housing. The power inlet contains three fuses, one of which is a spare. If the power supply fuses get blown, you will have to remove the fuse assembly (which is part of the inlet) to replace them. Use a flathead screwdriver to pry the fuse assembly out.



Pry fuse assembly out
using a flathead screwdriver

Additional Resources

General	www.ipcopper.com
Hardware Troubleshooting.....	www.ipcopper.com/support.htm
Other Support.	www.ipcopper.com/support.htm
Warranty Claims	www.ipcopper.com/warranty.htm

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