



CELLTRACKS ANALYZER II[®] *Networking Guide*



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CELLTRACKS ANALYZER II® Networking Guide

Overview

The CELLTRACKS ANALYZER II® (CTA2) supports connections to a customer Local Area Network (LAN) to provide the following features:

- **Remote Review of Results:** The capability to review sample images and report results from a location separate from the target analyzer. This feature requires the purchase of a CELLTRACKS® Remote Review Workstation (RRW). Reviewing result images is supported by both the CTA2 and the RRW.
- **Archive Results:** The capability to archive results to a network file share that is accessible from the LAN. The results can then be moved to another location for long-term storage. Archiving results is only supported by the CTA2.
- **Export Reports to Network File Share:** The capability to export reports as PDF files to a network file share that is accessible from the LAN. Exporting reports is supported by both the CTA2 and the RRW.
- **Transfer Results to the Laboratory Information System (LIS):** The capability to transfer completed results to a LIS. Transferring results to a LIS is supported by both the CTA2 and the RRW.

Menarini Silicon Biosystems, Inc. Provides

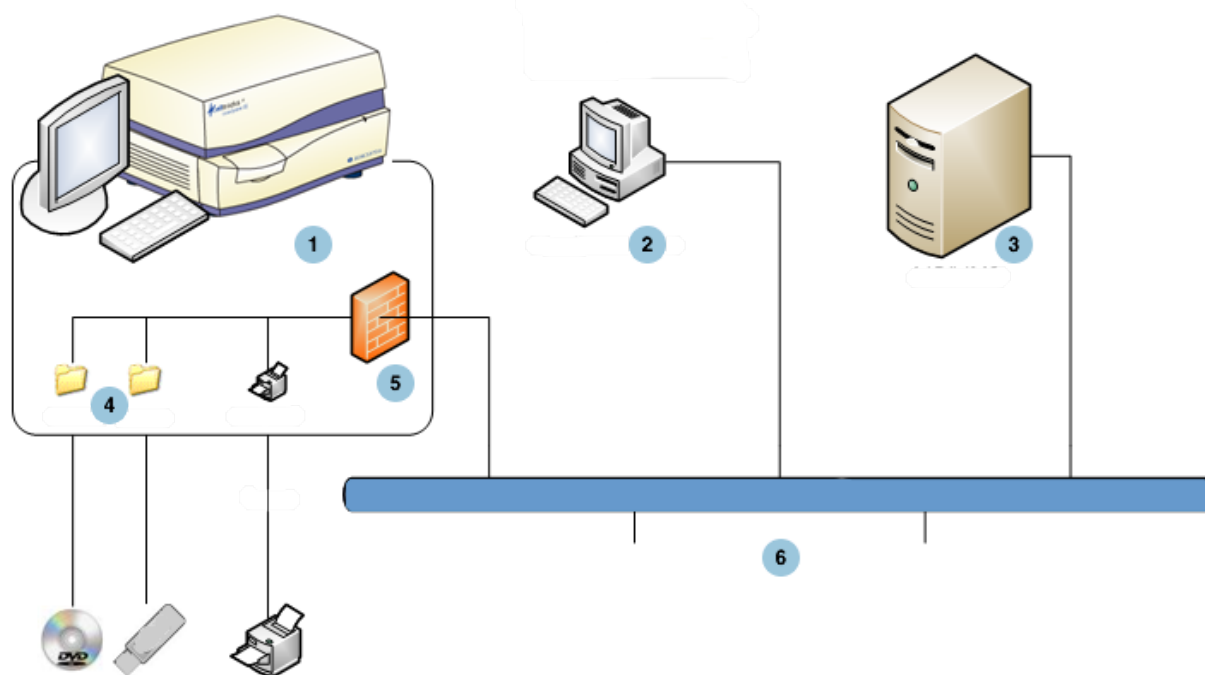
- A category 6 Ethernet cable (25 feet) with male RJ-45 connectors to connect the analyzer to the laboratory network jack
- A CELLTRACKS® Remote Review Workstation (purchased separately)

Customer Provides

- A secure LAN for the CTA2 and RRW connections
- Active network jacks with RJ-45 connector within 20 feet of the CTA2 and RRW
- Open network ports required for the networking features of the CTA2
- IP addresses or DNS server
- A mechanism to transfer and subsequently delete files from the CTA2 Network File Share on a regular basis if the network file share feature is used

Analyzer Networking

The diagram shows the CTA2 connected to peripherals and the customer Local Area Network (LAN). The LAN connection provides the connection to a LIS/LIMS system and a CELLTRACKS® Remote Review Workstation. A firewall protects the analyzer from the customer LAN.



- | | |
|---|--|
| 1 CELLTRACKS ANALYZER II® (CTA2) | 2 CELLTRACKS® Remote Review Workstation (RRW) |
| 3 Laboratory Information System (LIS) or Laboratory Information Management System (LIMS) | 4 Network File Share |
| 5 Firewall | 6 Customer LAN |

Network Interface

The CTA2 supports a physical connection to the customer LAN, using a category 6 Ethernet cable of 25 feet or less. The network feature can be enabled or disabled by the customer when necessary.

- IP Addressing: Static or Dynamic (DHCP). Static IP addresses are recommended if IP addresses frequently change.
- Link Speeds / Duplex: Auto, 10Mbps/Half, 10Mbps/Full, 100Mbps/Half, 100Mbps/Full, 1000Mbps/ Full. Note that 1000Mbps is only supported when using auto-negotiate.

NOTE: To optimize the performance of your Remote Review Workstation, Silicon Biosystems, Inc. recommends selecting the fastest link speed/duplex that is supported by your network.

- **Routes (Optional):** The system allows the user to configure up to five entries in the route table. Enter the IP addresses for any routes that must be defined for the LAN.

Information Required

The following information is required to configure the network Interface.

IP Address Information

- Dynamic Addressing (DHCP)
or
- Static Addressing with this information:
IP Address _____
Netmask _____
Gateway _____

Link Speed / Duplex

Choose one of the following

- Auto
- 10Mbps/Half
- 10Mbps/Full
- 100Mbps/Half
- 100Mbps/Full

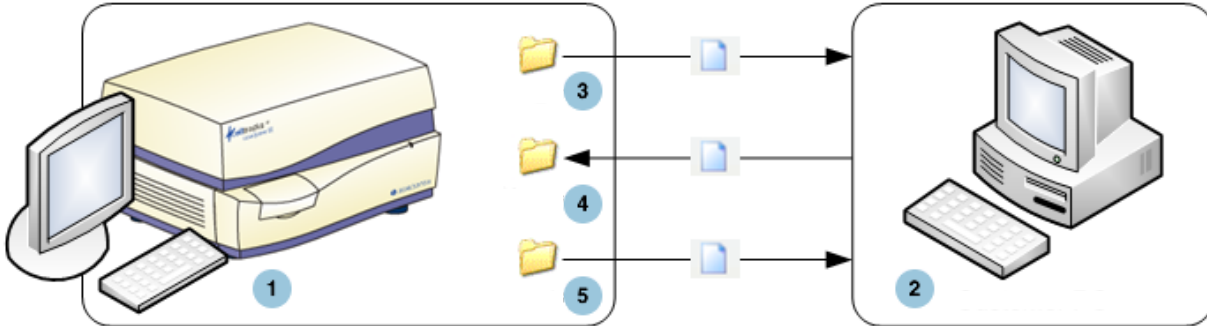
Network Routes (Optional)

If network routes are needed, the following information is required.

Gateway	Destination	Netmask

File Sharing

The diagram illustrates the three directories (folders) that can be accessed through the network from the Customer File Server (FS) and what types of actions occur on the files.



1 CELLTRACKS ANALYZER II® (CTA2)

2 Customer File Server (FS)

3 archive_export

File Actions:

CTA2: Write

FS: Read/Delete

4 archive_restore

File Actions:

CTA2: Read/Delete

FS: Write/Delete

5 reports

File Actions:

CTA2: Write

FS: Read/Delete

The CTA2 includes a set of three directories located on a separate file share system that can be accessed by the customer through the network for transferring files.

- Share Location: \\(IPaddress)share
- Size of Share: Approximately 50 GB (approximately 100 archived results)
- Security: Authentication (optional) to limit access to the share. Connection restricted to user ID: *celltracks* and the user-supplied password.

- Network Ports: The customer firewall must allow the following traffic to the analyzer's computer:

Port	Protocol	Service
139	TCP	NETBIOS
445	TCP	SMB over TCP

NOTE: Access to the CELLTRACKS[®] Network File Share location was tested using these operating systems: Windows 2000, Windows XP, Windows 7, and LINUX[®] (Kernel 2.6.26). Access from other operating systems is supported, but has not been tested by Menarini Silicon Biosystems, Inc.

Network File Share Directories

The CTA2 Network File Share contains three directories, each serving a different purpose.

	Purpose	File Type
archive_export	CTA2 writes archive files to this directory when the user initiates an archive operation to the network file share.	ISO image file
reports	CTA2 or RRW writes PDF files to this directory when the user exports a report or gallery images to the network file share.	PDF file
archive_restore	The customer returns archive files to this directory on a CTA2 for viewing images from an archived result. The CTA2 deletes files from this directory after 15 days.	ISO image file

Network File Share Files

The CTA2 creates all files initially written to the network file share, naming them with the naming conventions described in this table.

File Type	File Naming
ISO image file (maximum size 2GB)	Result archive file name: <SN>_<type>_<disk>.iso where: <SN> is the instrument serial number <type> is the sample type (P = Patient, C = Control) <disk> is the archive disk number

File Type	File Naming
PDF	Report files named: <SID>_<CartID>_<scan#>_<result#>_Report.pdf where: <SID> is the Sample ID <CartID> is the Cartridge ID <scan#> is the scan number for this result <result#> is the result number
PDF	Image files from review named: <SID>_<CartID>_<scan#>_<result#>_Gallery.pdf where: <SID> is the Sample ID <CartID> is the Cartridge ID <scan#> is the scan number for this result <result#> is the result number

Example of ISO file names in archive_export and archive_restore directories

CT0608030_P_000014.iso

CT0608030_C_000015.iso

Example of PDF file names in the reports directory

SID123_686534_1_1_Report.pdf

SID123_686534_1_1_Gallery.pdf

Information Required

The following information is required to configure the network file share:

Network File Sharing

Select the option. Enter a password if a password is required.

- Allow file sharing
- Require password

Password: _____

Managing the Network File Share

The customer must provide a mechanism to transfer and remove result archive files and reports (PDFs) from the network file share and delete the original files from the network file share. Additionally, if the operator needs to view images from a result that has been previously archived to the network file share, the customer must provide a way to transfer the desired result file back to the analyzer's network file share.

IMPORTANT: Recommendations

- The customer should transfer files (copy, verify, delete) from the archive_export and reports directories on a regular schedule. Menarini Silicon Biosystems, Inc. recommends transferring files every night or at least once a week.
- The customer should verify the successful transfer of the files before deleting them from the network file share.
- Transfers should be performed when the analyzer is not in use (after working hours) to prevent interfering with user operations.

NOTE:

- The ISO image file has the archive file disk number embedded into the file name. Do not change the name of the .ISO file when saving.
- At most, four results are included in an archive file (files limited in size to 2 GB).
- If the network file share becomes full, the operator will no longer be able to archive to this location.
- The CTA2 never deletes files from the archive_export or reports directory. There is no record of when these files have been transferred from the network file share.
- The CTA2 automatically deletes files from the archive_restore directory after 15 days.
- The operator can manually delete the files in the archive_restore directory using the CTA2 application.

Remote Review

The CTA2 allows the customer to review results using the CELLTRACKS[®] Remote Review Workstation (RRW), that is purchased separately from Menarini Silicon Biosystems, Inc.

- **Review Session:** Only one review station can be connected to the analyzer at one time.
- **Security:** The review station serial number and IP address must be configured on the CTA2 for authorization. Database information that contains patient information is encrypted.
- **Network Ports:** The customer firewall must allow the following traffic between the analyzer and the remote review workstation:

Port	Protocol	Service
111	TCP/UDP	portmap
631	TCP/UDP	printer IPP
2049	TCP/UDP	NFS
4000	TCP/UDP	NFS
4001	TCP/UDP	NFS
4002	TCP/UDP	NFS
5342	TCP/UDP	Postgresql DB (encrypted)
8082	TCP	Webservices XML-RPC

Information Required

The following information is required to configure remote review:

Remote Review

Select the option and then enter information for each review station.

- Allow remote review

Authorized review stations

Serial Number	IP Address

- For each review station, enter the following information:

IP Address Information

- Dynamic Addressing (DHCP)
or
- Static Addressing with this information:
IP Address _____
Netmask _____
Gateway _____

Link Speed / Duplex

Choose one of the following

- Auto
- 10Mbps/Half
- 10Mbps/Full
- 100Mbps/Half
- 100Mbps/Full

Network Routes (Optional)

If network routes are needed, the following information is required.

Gateway	Destination	Netmask

Laboratory Information System (LIS) Interface

The analyzer supports manual result transmissions to a supported LIS. The customer selects the network port and character encoding used for LIS connections.

NOTE: The interface to the supported LIS is documented in the *CELLTRACKS ANALYZER II[®] Laboratory Information System (LIS) Guide, J40170EN*.

- Connection: Ethernet, MLLP transport over TCP/IP (no serial connection). The CTA2 initiates the TCP/IP connection.
- Protocol: HL7 messaging based on the IHE LDA integration profile.
- Encoding: UTF-8 or ISO-8859-1
- Communication: Unidirectional (manual transmit of results, no images)
- Network Port: User-defined. The customer firewall must allow traffic to the LIS IP/Port for TCP messages.

- LIS Facility: Name of the organizational entity responsible for the LIS connection.
- LIS ID: Unique identifier for the lab software application that will receive the messages from the CTA2.

Port	Protocol	Service
<port>	TCP/IP	LIS

Information Required

The following information is required to configure the LIS connection:

LIS Connection

Choose one of the following character encodings:

- UTF-8
- or
- ISO-8859-1

Enter the specific information:

Outgoing IP _____
 Outgoing Port _____
 LIS Facility _____
 LIS ID _____

Frequently Asked Questions

What operating system (OS) is used by the CELLTRACKS ANALYZER II® (CTA2) and the CELLTRACKS® Remote Review Workstation (RRW)?

Linux. Debian version 5.0.8

What type of security is provided by the CTA2?

- The CTA2 is a closed system. Access to other applications is restricted.
- Software firewall (iptables v1.4.2)
- Unused services have been removed from the operating system (OS) (web server, email, etc.)
- Only inbound ports are those required for networking features enabled by the customer.
- The CTA2 does not require access to customer network drives and does not require a user account on the customer LAN. Network file sharing is performed using a shared partition that resides on the CTA2 hard drive.
- Optionally, access to the CTA2 network file share can be restricted using a password.
- IP and user authentication is enforced for RRW connections.

What type of OS security patches or virus protection is provided on the CTA2?

The CTA2 does not have virus protection software. Computer viruses are avoided by restricting user operations on the CTA2 and preventing the virus from entering the CTA2.

Does the CTA2 support addressing by computer names?

No. Communication between the CTA2 and RRW is performed using the IP address.

What happens if the IP address changes on the CTA2 or RRW?

If the CTA2 or RRW is configured to use dynamic IP addressing (DHCP) and these addresses change, it will affect the setup for network file sharing and the RRW link.

The RRW link is established using the IP address, and authentication performed during the review connection is also performed using the IP address. If IP addresses change, then these changes must be updated manually on the **Networking** screen on the CTA2.

Example of Network Information

This section illustrates examples of output sections from the Network Information utility found on the **Networking** screen on the CTA2. These sections of the output are the most useful for troubleshooting common issues.

Network Hardware Settings

This section indicates the current computer network hardware settings and they are underlined in the example:

Advertised auto-negotiation: Is Auto set for Link Speed?

Speed: Current link speed setting

Duplex: Current Duplex setting

ethtool eth0

Settings for eth0:

Supported ports: [MII]

Supported link modes: 10baseT/Half 10baseT/Full

100baseT/Half 100baseT/Full

1000baseT/Full

Supports auto-negotiation: Yes

Advertised link modes: 10baseT/Half 10baseT/Full

100baseT/Half 10baseT/Full

1000baseT/Full

Advertised auto-negotiation: yes

Speed: 100Mb/s

Duplex: Half

Port: MII

PHYAD: 1

Transceiver: external

Auto-negotiation: on

Supports Wake-on:g

Wake-on:d

Link detected: yes

Assigned IP Address and Netmask

This section lists the assigned IP address and netmask for this computer and these settings are underlined in the example.

HWaddr: MAC Address

Inet addr: IP Address

Mask: Netmask

/sbin/ifconfig

```
eth0  Link encap:Ethernet HWaddr 00:30:48:5d:0e:38
      inet addr:10.8.78.233 Bcast:10.8.79.255 Mask:255.255.254.0
      UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
      RX packets:372710 errors:0 dropped:0 overruns:0 frame:0
      TX packets:1767 errors:0 dropped:0 overruns:0 frame:0
      collisions:0 txqueuelen:1000
      RX bytes:36147112 (34.4 MiB) TX bytes:329513 (321.7 KiB)
      Interrupt:20

lo    Link encap:Local Loopback
      inet addr:127.0.0.1 Mask:255.0.0.0
      UP LOOPBACK RUNNING MTU:16436 Metric:1
      RX packets:626676 errors:0 dropped:0 overruns:0 frame:0
      TX packets:626676 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:0
      RX bytes:111537147 (106.6 MiB) TX bytes:111537147 (106.3 MiB)
```

DHCP Server Information

This section lists the names and IP addresses for the DNS servers. If static IP addresses are used, this section is empty.

```
*****
cat /etc/resolv.conf
*****
domain ocdus.na.jnj.com
search ocdus.na.jnj.com
nameserver 10.8.76.31
nameserver 10.35.51.87
nameserver 10.23.40.50
```

Printer Information

This section lists the printer queue name and the serial number of the printer that is attached to a USB port.

```
*****
lpstat -t
*****
Scheduler is running
no system default destination
device for deskjet_6940:
usb://HP/Deskjet%206940%20series?serial=MY01PCK23M04Q9
deskjet_6940 accepting requests since Mon Jun 11 13:37:37 2012
Printer deskjet_6940 is idle.
enabled since Mon Jun 11 13:37:37 2012
```

Current Configuration of the Local Firewall

The following section lists the current configuration of the local CTA2 or RRS firewall. In the example below, networking and network file sharing is enabled. Note the open ports 139 and 445 for file sharing. Port 8 is used by the Ping server. These ports are underlined in the example.

iptables -nL

Chain INPUT (policy ACCEPT)

target	prot	opt	source	destination	
ACCEPT	all	--	0.0.0.0/0	0.0.0.0/0	
REJECT	all	--	0.0.0.0/0	127.0.0.0/8	reject-with icmp-port-unreachable
ACCEPT	all	--	0.0.0.0/0	0.0.0.0/0	state RELATED, ESTABLISHED
ACCEPT	icmp	--	0.0.0.0/0	0.0.0.0/0	<u>icmp type 8</u>
ACCEPT	tcp	--	0.0.0.0/0	0.0.0.0/0	<u>tcp dpt:139</u>
ACCEPT	tcp	--	0.0.0.0/0	0.0.0.0/0	<u>tcp dpt:445</u>
REJECT	all	--	0.0.0.0/0	0.0.0.0/0	reject-with icmp-port-unreachable

Chain FORWARD (policy ACCEPT)

target	prot	opt	source	destination	
REJECT	all	--	0.0.0.0/0	0.0.0.0/0	reject-with icmp-port-unreachable

Chain OUTPUT (policy ACCEPT)

target	prot	opt	source	destination
ACCEPT	all	--	0.0.0.0/0	0.0.0.0/0

Current Entries in the Route Table

This section lists the current entries in the route table. The example shows what is displayed for a CTA2 with an empty route table. An empty route table is the most likely configuration.

route -n

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
10.8.78.0	0.0.0.0	255.255.254.0	U	0	0	0	eth0
0.0.0.0	10.8.78.1	0.0.0.0	UG	0	0	0	eth0

Revision History

Version	Section	Description
2019-06	All Copyright page	Changed DS-SPE-25352 to MAN-000049276. Changed Company Name and addresses. Changed Company on all pages marked with change bar.
2017-01-04	Title page	Revision to patent information.
2016-07-01	All Copyright page	Changed LBL50902 to DS-SPE-25352. Changed Company Name for Belgium address and removed MAGNEST®.
2014-01-01	All	Janssen Diagnostics, LLC
2013-03-22	All	Initial release of this guide.

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