



MiCROTEC[®]
INNOVATING THE WOOD

Timber Measurement Society

29.10.2008 Reno

MICROTEC FACTS:

Founded: 1980

Locations:

Brixen -	ITALY
Linz -	AUSTRIA
Venezia -	ITALY
Salmon Arm-	CANADA

Sales: €24 Mio.

Employees: 135



Headquarter in Brixen ITALY

MICROTEC
INNOVATING THE WORLD

**MICROTEC
NORTH AMERICA:**

Established: July 2008

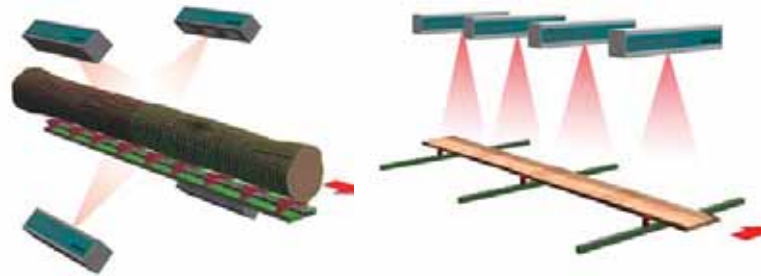
Employees: 15

MiCROTEC[®]
INDUSTRIES NORTH AMERICA INC.



Located in Salmon Arm, BC

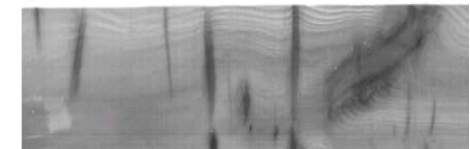
Scanning Devices for Industrial Wood Processing



Logs



Boards



Strength Grading

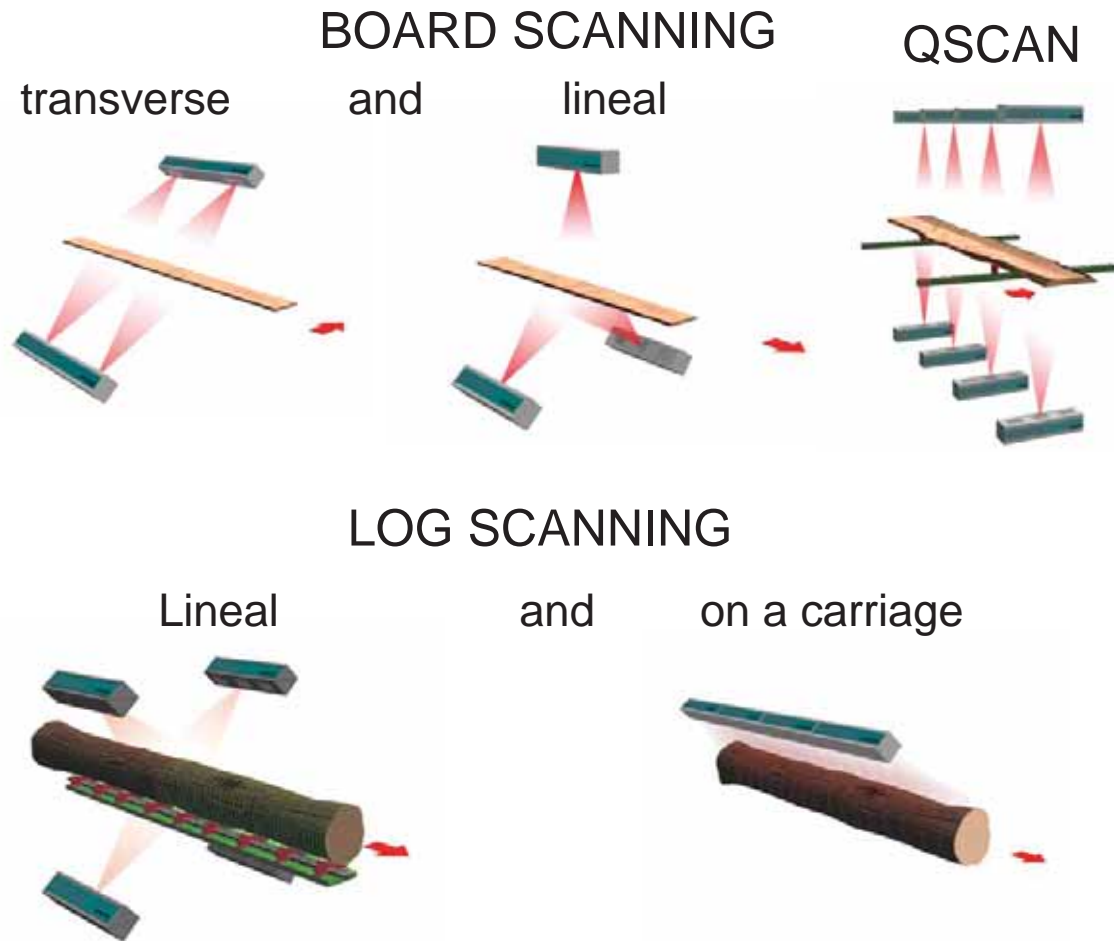


LOG SCANNING - Scaling

3D Scanning

Modular 3D scanning device

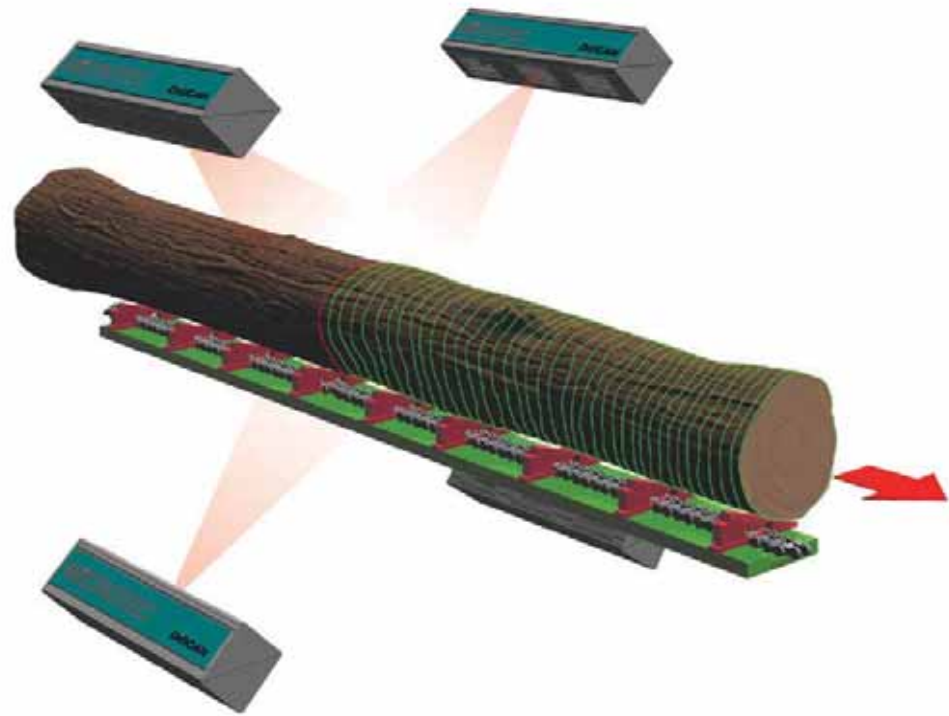
DiSCAN



Log Scanning

3D true shape
scanning

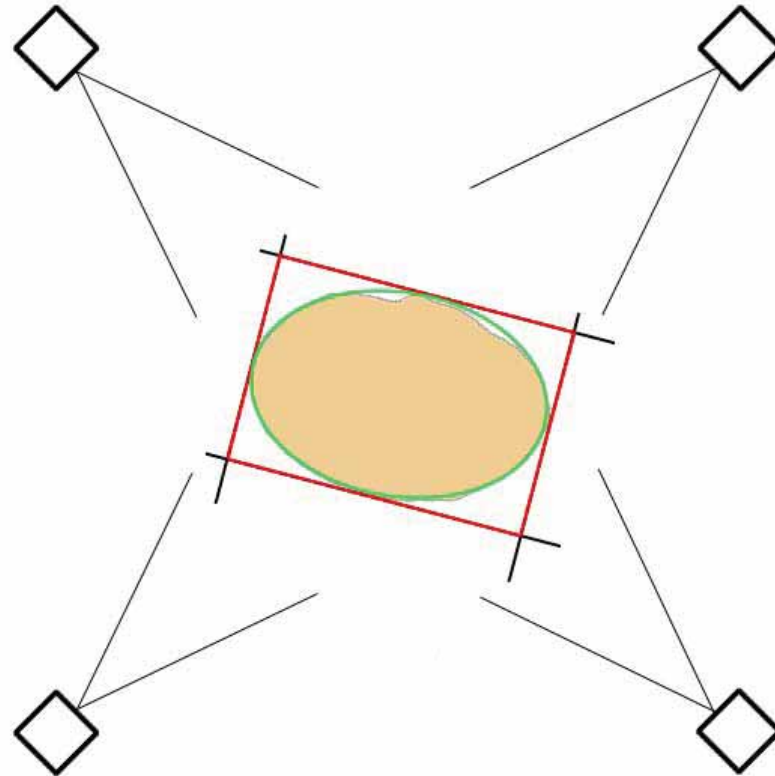
*Di*SHAPE



Log Scanning

3D true shape
scanning

DiSHAPE



DiSHAPE – Measuring principle

Log Scanning

3D true shape
scanning

DiSHAPE



DiSHAPE - Mounting example

Log Scanning

3D true shape
scanning

DiSHAPE



DiSHAPE - Mounting example

Log Scanning

3D true shape scanning

DiSHAPE

The screenshot displays the DiSHAPE software interface. At the top, there is a menu bar with options: Datei, Test, MCC, Konfiguration, Tools, Störungen, Statistik. Below the menu bar are icons for Anmelden, Abmelden, Speichern, Test Hardware, Quitieren, and Ende. The main window title is "MICROTEC DiSHAPE".

On the left, a 3D grid shows a blue circular scan area on a red background. Below it are two horizontal bar charts showing data points: 714, 1428, 2142, 2857, 3571, 4286.

On the right, a table displays measurement data:

Länge [cm]	400
Zopf [mm]	204 204 207 11
Mitte [mm]	220 226 226 200
Kopf [mm]	247 244 247 389
Abholigkeit [mm/m]	11
Krümmung [mm/m]	1
Kubatur[m3]	0.150
Lage:	Zopf vorn

Below the table is a 3D wireframe model of a cylindrical object. To the right of the table is a "Mess" button and a status indicator "Keine Störung!".

At the bottom, a log table is visible:

Typ	Nr	Beschreibung	Zeit	?	Ack.	Pin
1	13	Fehler Watchdog Modul 2-Sensoren 2	17050000 13.26.38			0
2	10	Fehler Watchdog Modul 1-Sensoren 1	17050000 13.26.38			0
3	11	Fehler Watchdog Modul 1-Sensoren 2	17050000 13.26.38			0
4	12	Fehler Watchdog Modul 2-Sensoren 1	17050000 13.26.38			0

At the bottom of the window, it says "Microtec" and "Checksumme Programm: 724C Checksumme Parameter: 8383 Checksumme Jäger: C018". The date and time are "17/06/2005 17:07:51".

DiSHAPE software – Main screen

Log Scanning

3D true shape
scanning

*Di*SHAPE



3D reconstruction



Real image

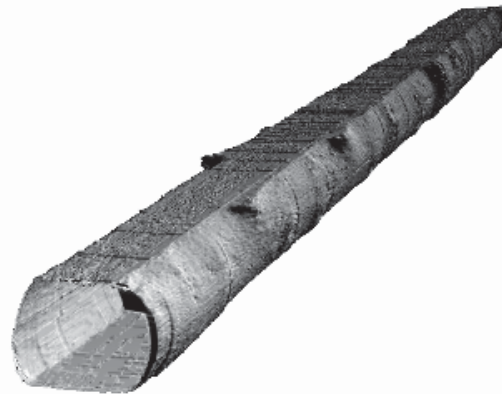
Log Scanning

3D true shape
scanning

*Di*SHAPE



Real image



3D reconstruction

Log Scanning

3D true shape scanning

DiSHAPE

The screenshot shows the DiSHAPE software interface. At the top, there is a menu bar with options: File, Production, Test, Configuration, Tools, Messages, Statistics. Below the menu bar is a toolbar with icons for Log on, Log off, Save, Production, CP, LP, Service, Quit, and Exit. The main window title is "MICROTEC MAXICUT".

The interface displays the following information:

- Production Data:**
 - CP: 160 x 14, 180 x 13
 - SW VS: 12. 18. 37
 - SW'NS: 12. 18. 24
- Communication Status:**
 - Keine Kommunikation mit SPS1
 - Kommunikation DiSHAPE 1
 - Kommunikation DiSHAPE 2
 - Kommunikation DiSHAPE 4
 - Kommunikation SPS_VS
 - Kommunikation SPS_NS
- Stammanforderung (Inventory Requirements):**
 - Stamm vor ME2: 0
 - Stamm vor ME3: 0
 - Stamm vor ME4: 0
- Log Properties:**
 - Length [cm]: 400
 - Top [mm]: 377
 - Bottom [mm]: 411
 - Conicity [mm/m]: 8
 - Curvature [mm/m]: 0
 - Cubic meters [m3]: 0.000
 - LP left side [mm]: 37 37 18
 - LP right side [mm]: 37 37 12
 - Cant width [mm]: 180
 - Value [S]: 13.74 1.52, 16.85, 32.11
- Log Table:**

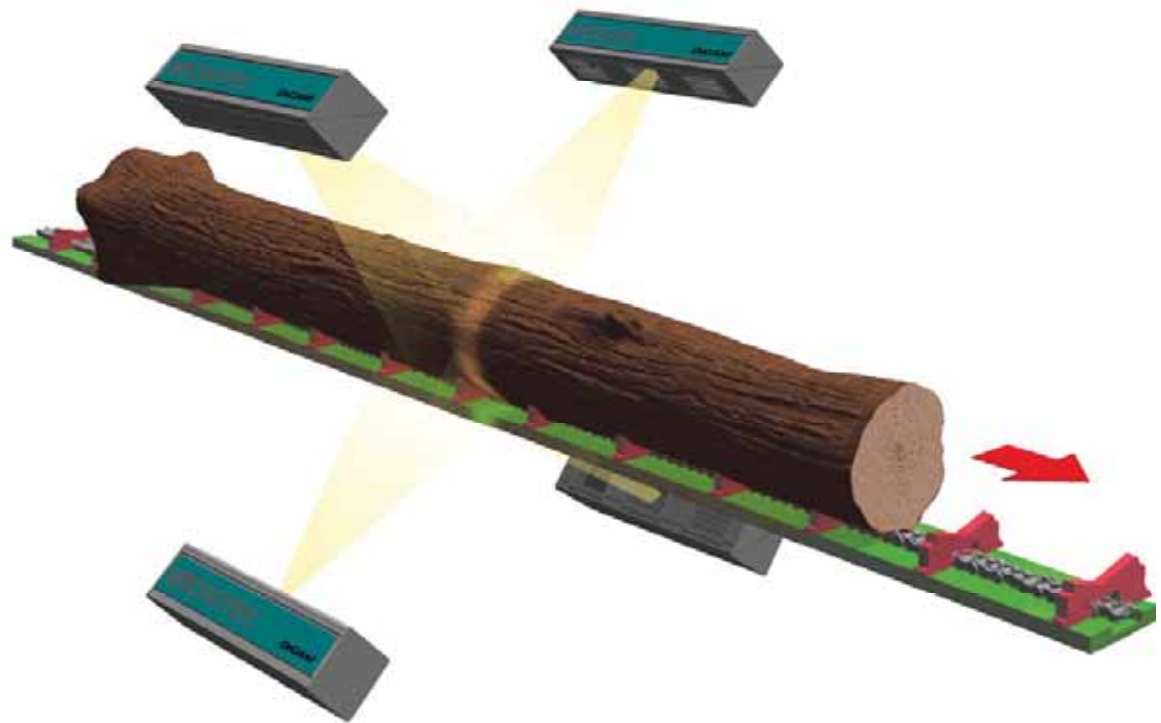
3DF1	3DF2	SEND	F45	F46	F47	F48	F49	F50	F51	F52	F53	F54	F55	F56	F57	F58	F59	F60	
1																			
2																			
3																			
4																			

MAXICUT software - Main screen

Log Image Scanning

The digital log

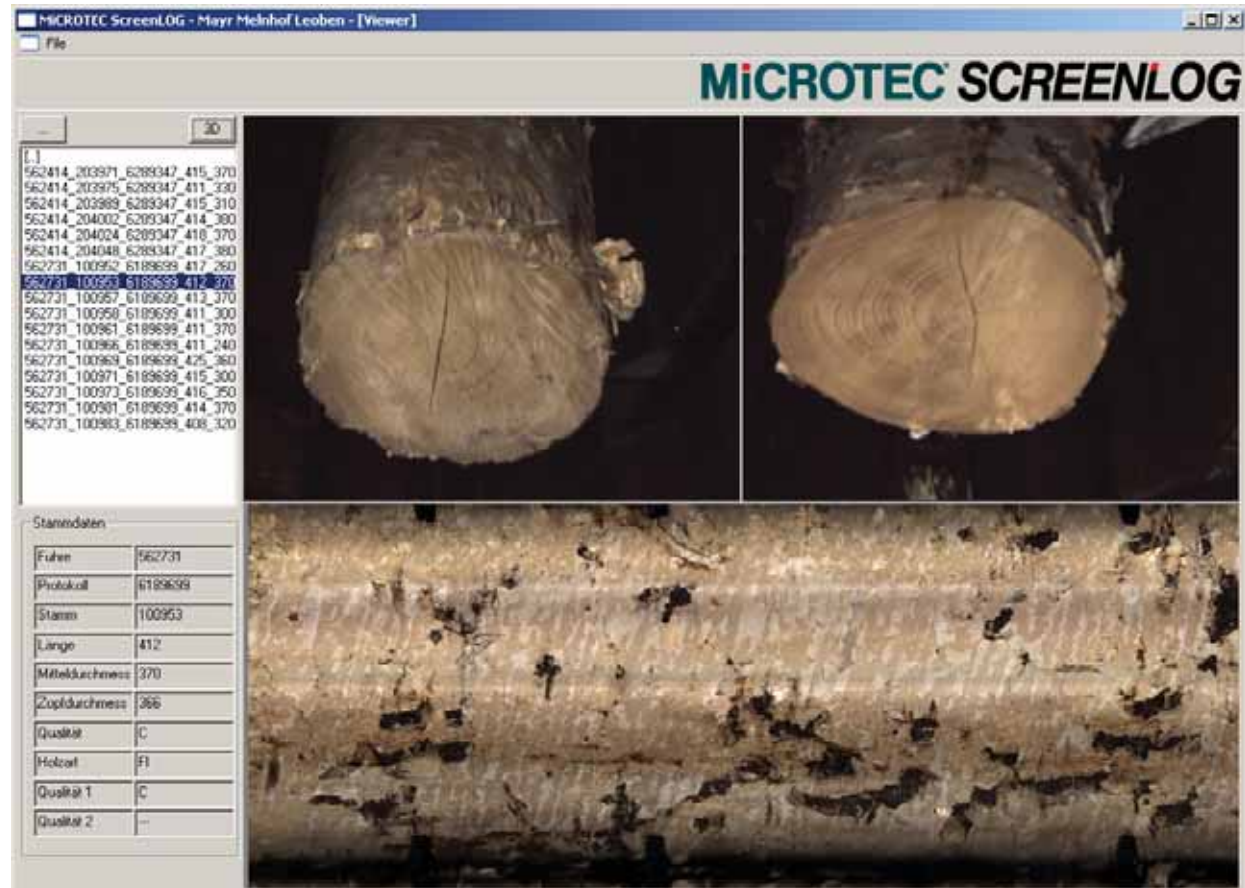
SCREENLOG +



Log Image Scanning

The digital log

SCREENLOG +



SCREENLOG plus software - Main screen

Log Image Scanning

The digital log

SCREENLOG +



SCREENLOG - Images

Log Image Scanning

The digital log

SCREENLOG



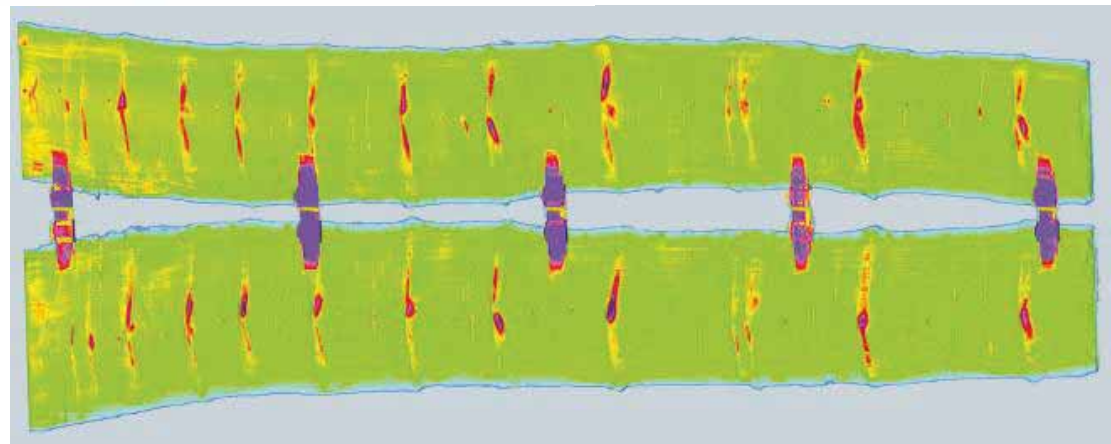
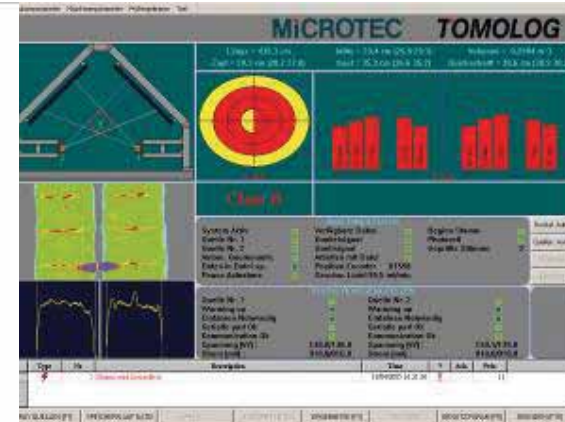
SCREENLOG - Images

X-Ray Log Scanning

A look inside the Log

Max. log diameter
16" (= 45 cm)

TOMOLOG



TOMOLOG – Measuring principle, Main screen, Image of a log

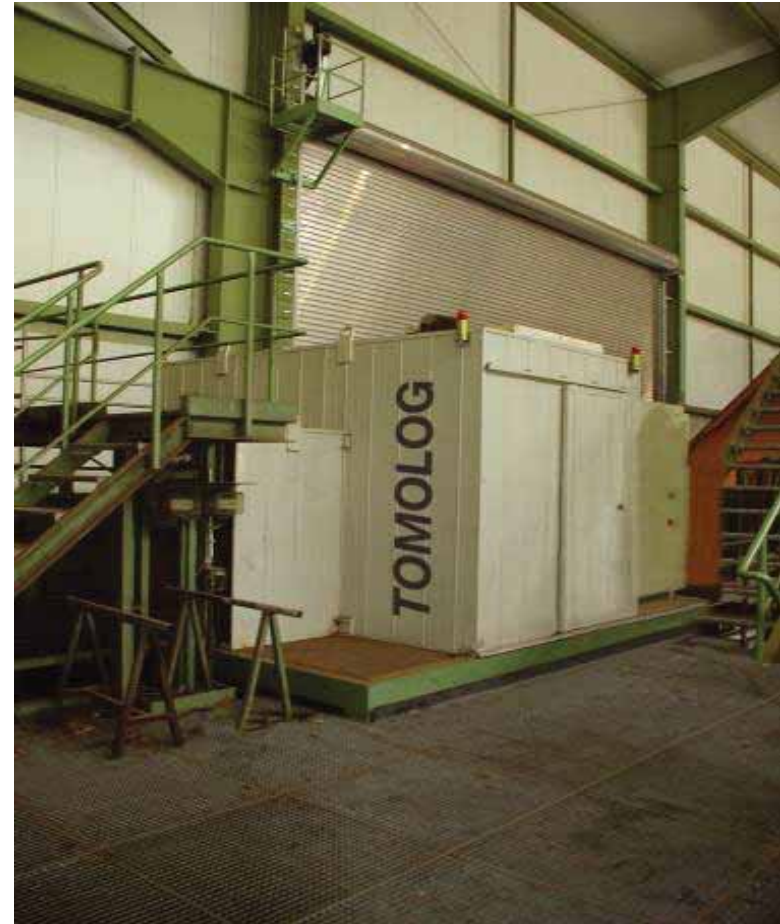
X-Ray Log Scanning

A look inside the Log

TOMOLOG – Test System

TOMOLOG

R&D system
located in Linz,
Austria



X-Ray Log Scanning

A look inside the Log

TOMOLOG



Discrete Tomography
Ring Reconstruction



Actual
(Photographic Image)

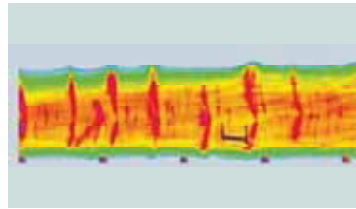
Growth
(Annual)
Rings

Multi Sensor Log Scanning

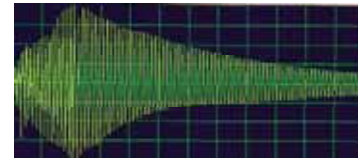
The digital log

LOGEYE

TOMOLOG



ViSCAN



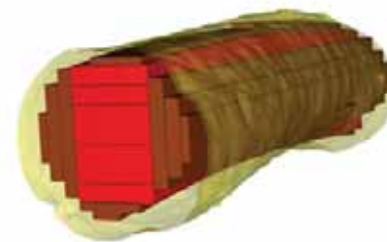
DiSHAPE



SCREENLOG



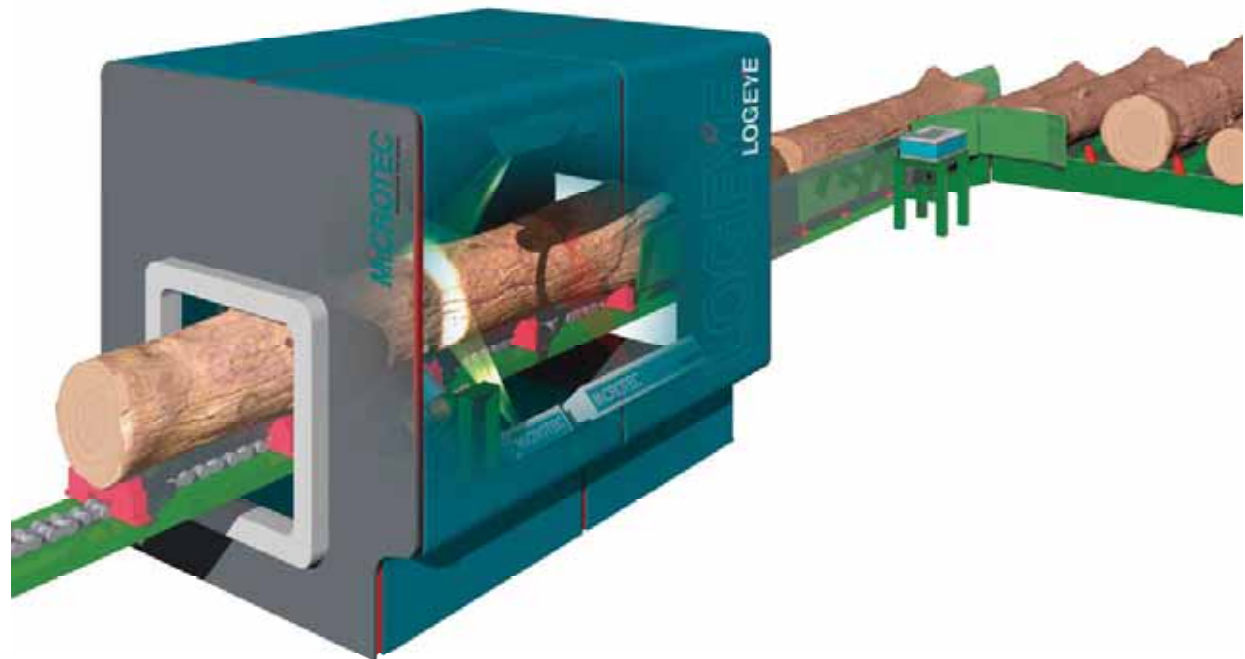
MAXiCUT



Multi Sensor Log Scanning

The digital log

LOGEYE





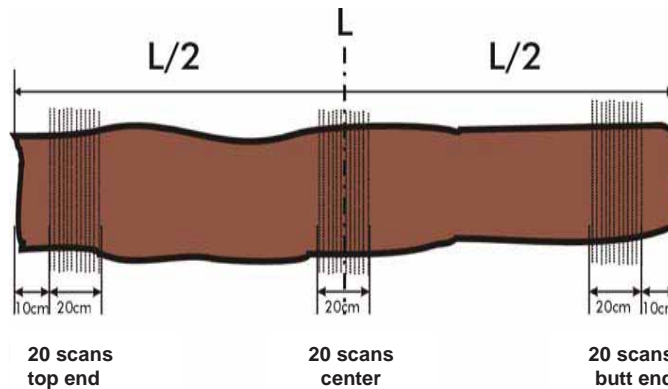
BASIC CALCULATION METHODS

Log Scanning Calculation Modes

Calibrated
log scanning
for lineal scanning
applications

Calculations meet the
Austrian measuring &
calibration standards

Mid diameter measurement:



calculation of the diameter for each scan:

According to the Austrian Measuring &
Calibration Standards and
ÖNORM L-1021



d1 and d2 are
measured at 0.05" resolution,
but rounded off to 0.5"

$$D = \frac{d1 + d2}{2}$$

also rounded off to 0.5"

mid diameter (in the middle of the log):

Dm = smallest measuring result in the middle of the log

top end diameter (small end diameter):

sed = smallest measuring result at the front end or the rear end of the log

volume calculation:

$$V = \frac{Dm^2 \times \pi \times L}{4}$$

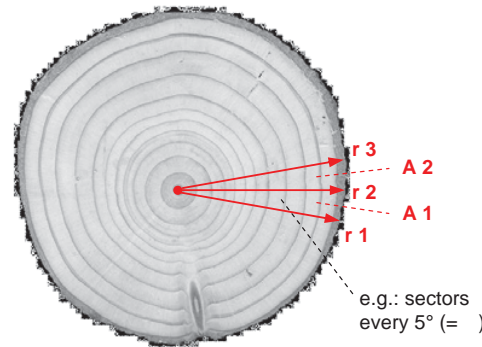
Dm = mid diameter

L = rounded off length in 1ft or 2ft increments

Log Scanning Calculation Modes

Log scanning
for lineal scanning
Applications

Sectors diameter – physical volume:



calculation of the single cross-sectional area:

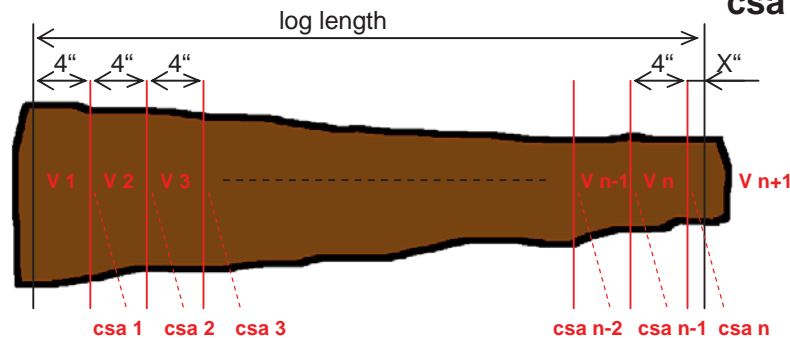
radiuses $r_1, r_2, r_3, \dots, r_n$
are calculated in 5° steps (for example)

A = area of each sector

$$A = \frac{r^2 \times \pi \times \alpha}{360^\circ}$$

csa = total cross-sectional area

$$csa = A_1 + A_2 + \dots + A_n$$



calculation of the physical volume:

The total cross-sectional areas $csa_1, csa_2, csa_3, \dots, csa_n$ are calculated in 4" (10cm) steps (for example)

$V_1, V_2, V_3, \dots, V_n, V_{n+1}$ are calculated for each section (frustum)

V = total volume of the log

$$V = V_1 + V_2 + V_3 + \dots + V_n + V_{n+1}$$

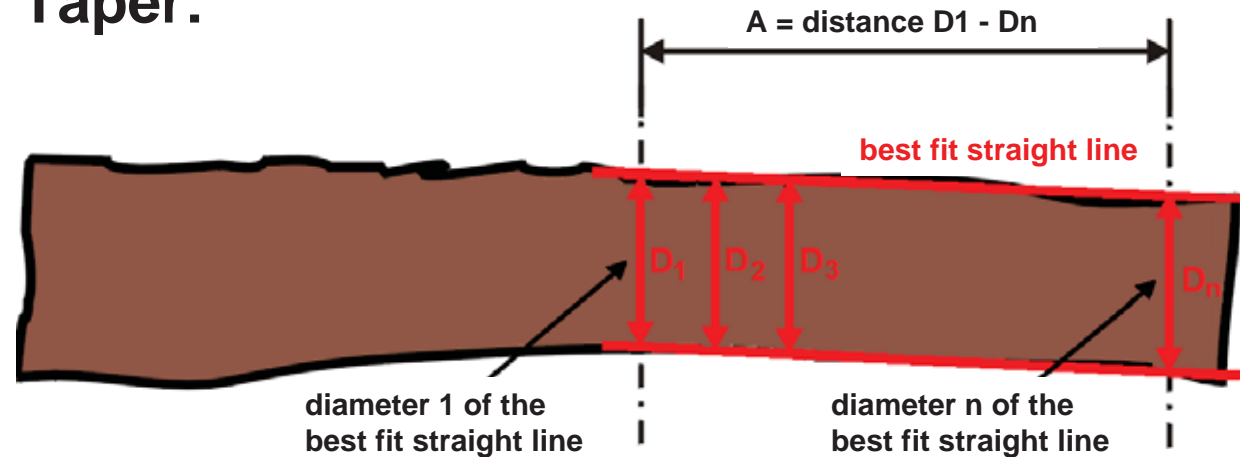
Log Scanning Calculation Modes

Log scanning
for lineal scanning
applications

Taper:

Calculates the average
change in the diameter
from the top
to the bottom
of the measured log

Taper:



D = diameters along the best fit line
 A = length of the best fit line

$$\text{taper} = \frac{D_1 - D_n}{A} = \text{mm} / \text{m}$$

example: $D_1 = 10''$
 $D_n = 8''$
 $A = 6 \text{ ft}$

$\text{taper} = (10 - 8) / 2$
 $\text{taper} = 1''/\text{ft}$

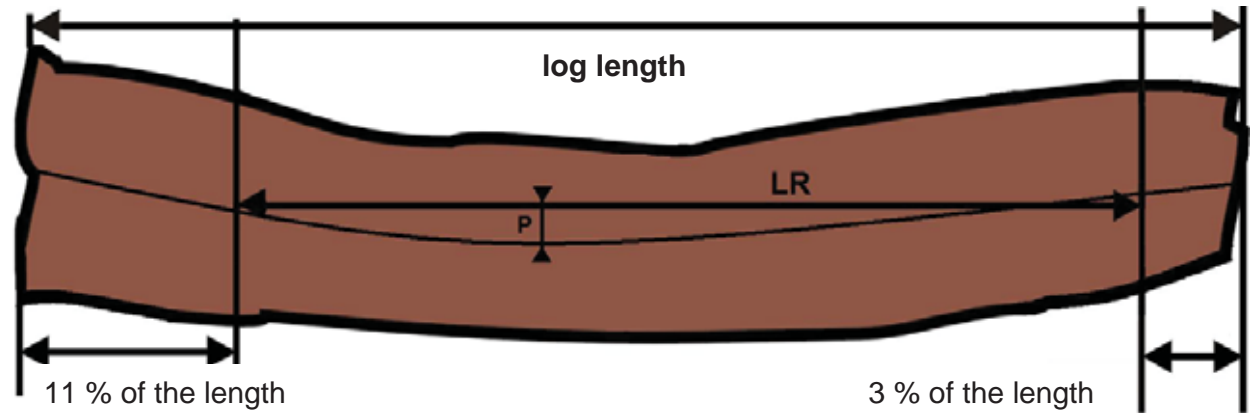
Log Scanning Calculation Modes

Log scanning
for lineal scanning
applications

Sweep:

Calculates the log
sweep relative to the
length

Sweep:



P = Pfeilmaß in inches
LR = length reference in Feet

$$Ph = \frac{P}{LR} = \text{ins} / \text{Ft}$$

example: P = 1"
LR = 12'

Ph = 1.0 / 12
Ph = 0.083 inches/foot

Log Scanning Calculation Modes

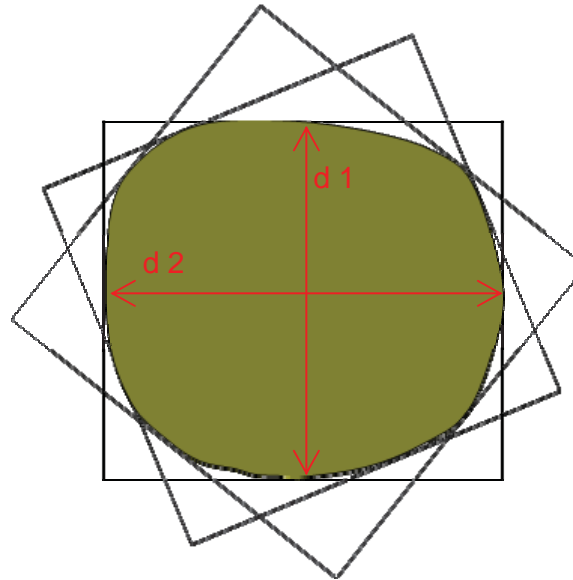
Log scanning
for lineal scanning
applications

Ovality:

Calculates log ovality
using the
“rotating gripper”

Calculations meet the
Austrian measuring &
calibration standards

Ovality:



O = ovality in %
d min = diameter d 1
d max = diameter d 2

d min and d max are measured
at the position of the smallest
mid diameter Dm

$$Dm = \frac{d1 + d2}{2}$$

$$O [\%] = \frac{d_{\max} - d_{\min}}{d_{\min}} \times 100$$

example: d1 = 15 Inches
d2 = 20 Inches

O [%] = (20 - 15) x 100 / 15
O [%] = 33.3 %



MEASURING REPORTS

Log Scanning Measuring reports

Load report
Single Log report

Calibration criteria
reported

Load and single log report:

Microtec RHP Gewerbepark 26
4040 Linz

MICROTEC Industrieautomation / LINE

Round wood acceptance

Contract	: Contract 01	Delivery n.	: Delivery 01
Load Nr.	: 3 from 29/04/2008 13:57	Listing Nr.	: 1
Supplier	: 1 Supplier 01	Supply date	: 29/04/2008
Operator	: 1 Operator 01	Date (act.)	: 29/04/2008
Forwarder	: 1 Forwarder 01	Time (act.)	: 16:33:22
Feld ndisp	:		
District	: District 01	Goods receipt:	

Calibration code: LLLLLL
Software code: MWOK

Calibration criteria:
Scanner: DISHAPE
Lengths range: 1.40 - 10.00 m
Diameter range: 0 - 90 cm
Checks: Prg. Durchm. Länge
85EA C3C0 A535

The calibration criteria
of the Log Scanner
are printed on the report

Max. perm. Taper: 99.9 cm/m
Length steps for calculating volume: with Steps: 1/2 m (until 6 m)
Overtris: 1cm
Bark deduction: No bark deduction

Legend:

No.	Current number	Qu*	Quality (* = changed auto.)
Sp	Species	LD	length deduction [dm]
Lg	measured log length [cm]	D	Bark/Ice deduction [cm]
MD	Mid diameter [cm]		
V	Volume [charging volume] m3		
m	manual input of log data		
M	log with metal		
>	Correction due to taper	-	Correction due to crook+awEEP

The measured values Lg, MD and V are liable to the calibration authority.

Nr.	Sp	Qu	Lg	MD	D	LD	V	Nr.	Sp	Qu	Lg	MD	D	LD	V	Nr.	Sp	Qu	Lg	MD	D	LD	V
1	Sp	A	407	39	0	0	0.48	2	Sp	B	409	36	0	0	0.41	3	F1	B	312	34	0	0	0.27
4	F1	B	405	36	0	0	0.41	5	F1	A	512	30	0	0	0.35	6	Sp	C	409	29	0	0	0.26
7	Sp	B	412	24	0	0	0.18	8	Sp	A	408	25	0	0	0.20	9	F1	B	404	25	0	0	0.20
10	F1	B	416	28	0	0	0.25	11	Sp	C	407	25	0	0	0.20	12	F1	B	411	24	0	0	0.18
13	Sp	C	510	36	0	0	0.51	14	Sp	B	309	28	0	0	0.18	15	F1	C	312	37	0	0	0.32

Log Scanning Measuring reports

Total report

Total report:

MICROTEC		Gewerbepark 26																	
4041 Linz		MICROTEC Industrieautomation / LINZ																	
Summenprotokoll																			
Rundholzübernahme																			
Vertrag :		Lieferschnr. :																	
Fuhre Nr. : 2	vom 18/11/2003 10:07	Protokoll Nr. : 9																	
Aufgabe : 2		Liefertag : 18/11/2003																	
Lieferant : 2	Lieferant	Datum (akt.) : 18/11/2003																	
Übernehmer : 2	Max Mustermann	Uhrzeit (akt.) : 10:10:47																	
Frächter : 1	Ortner	Info :																	
Waldort :																			
LEGENDE:																			
Ha	Holzart	MEDIA	Durchschnittswerte:																
Qu	Qualität	Länge	durchschn. Länge																
Stkl	Stärkeklasse	Volumen	durchschn. Volumen																
Stk	Stückzahl	Durchm.	durchschn. Sortendurchmesser																
		Zd	durchschn. Zapfdurchmesser																
Lang	gesamte Sortenlänge	Abh	durchschn. Abholzigkeit																
Vol	Volumen	Krg	durchschn. Krömmung																
		Ovl	durchschn. Ovalität																
Übernommene Ware:																			
Ha	Qu	Stkl	2,5 m		3 m		4 m		Lang	M E D I A									
			Stk	Vol	Stk	Vol	Stk	Vol		Länge	Volumen	Durchm	Zd	Abh	Krg	Ovl			
Pi	ABC	2a					4	0.724	4	16.00	0.724	4.0	0.181	24.0	22.4	5.0	0.0	24.5	
Pi	ABC	2b					1	0.196	1	4.00	0.196	4.0	0.196	25.0	24.7	5.0	0.0	3.0	
Pi	ABC	3a					1	0.243	1	4.00	0.243	4.0	0.243	30.0	25.4	0.0	0.0	124.0	
Pi	ABC	4a					1	0.528	1	4.00	0.528	4.0	0.528	41.0	39.6	0.0	0.0	49.0	
Pi	ABC						7	1.733	7	28.00	1.731	4.0	0.247	27.4	25.6	3.6	0.0	39.9	
Pi	Fb	3b	1	0.073					1	2.50	0.071	2.5	0.071	19.0	19.9	0.0	0.0	0.0	
Pi	Fb	2b	1	0.143					1	2.50	0.143	2.5	0.143	27.0	25.4	21.0	0.0	92.0	
Pi	Fb	3a	1	0.171					1	2.50	0.177	2.5	0.177	30.0	25.6	0.0	0.0	122.0	
Pi	Fb	3a	3	0.394					3	7.50	0.391	2.5	0.130	28.3	21.9	7.0	0.0	11.3	
Pi			3	0.394				7	1.733	10	35.50	2.122	3.6	0.212	24.6	24.5	4.6	0.0	49.3

Protokoll: 9 Vertrag: Lieferschnr. : 2

Log Scanning Measuring reports

Calibration report

Calibration report:

1.25

A - ENNS

Ebene 1		Durchmesser Soll [mm]		Durchmesser Ist [mm]		Winkel	Abweichung [mm]	
D1	D2	D1	D2	D1	D2	(°)	D1	D2
449.6	449.9	449.3	449.9	45	-0.3	0.0		
449.6	449.9	449.0	450.1	45	-0.6	0.2		
449.6	449.9	449.2	450.1	45	-0.4	0.2		
449.6	449.9	449.4	449.9	45	-0.2	0.0		
449.6	449.9	449.5	450.0	45	-0.1	0.1		
449.6	449.9	449.5	449.6	45	-0.1	-0.3		
449.6	449.9	449.4	449.7	45	-0.2	-0.3		
449.6	449.9	449.2	450.2	45	-0.4	0.3		
449.6	449.9	449.2	450.2	45	-0.4	0.3		
449.6	449.9	449.5	450.2	45	-0.1	0.3		
449.6	449.9	449.2	449.8	45	-0.4	-0.1		
449.6	449.9	449.4	449.8	45	-0.2	-0.1		
449.6	449.9	449.5	450.1	45	-0.1	0.2		
449.6	449.9	449.5	450.4	45	-0.1	0.5		
449.6	449.9	449.3	450.0	45	-0.3	0.1		
449.6	449.9	449.5	449.8	45	-0.1	-0.1		
449.6	449.9	449.5	449.8	45	-0.1	-0.1		
449.6	449.9	449.1	449.8	45	-0.5	-0.1		
449.6	449.9	449.1	449.8	45	-0.5	-0.1		
449.6	449.9	449.0	449.9	45	-0.6	0.0		
		449.3	450.0		-0.3	0.1		

Checksumme Programm: 4786 Checksumme Durchmesser: 5BF2 Checksumme Länge: 8200
 Messmethode: 1
 Max. Elliptizität fuer Kreiserkennung [mm]: 3

Log Scanning

**Regulatory
Reporting**

Regulatory Reporting

- **Dedicated Interface with regulatory agency to monitor and audit any changes to the system's calibration**
- **Alarm/notification sent to agency & Microtec when any change is made to calibration data.**
- **Maintains integrity of the volume calculations in scaling applications.**

Log Scanning

Summary

Technical requirements for the installation of a Log Scanner:

- Lineal conveyor
- Max. feeding speed 780 ft/min (240 m/min)
- Enclosure for the measuring equipment is required:
 - for protection against extraneous light
 - for protection against environmental conditions (rain, snow, ...)

Log Scanning

Summary

Measuring results:

- Length
- Diameters
- Volume
- Taper
- Sweep
- Ovality

Quality evaluation:

- Manual quality evaluation

Log Scanning

Summary

Reports and data access:

- **Measuring reports:**
 - **Supplier report**
 - **Load report**
 - **Single log report**
 - **Total report**
- **Log photograph**
to cross check the manual quality evaluation
- **All measuring results are accessible via network**
(ASCII, XML, PDF-Files)

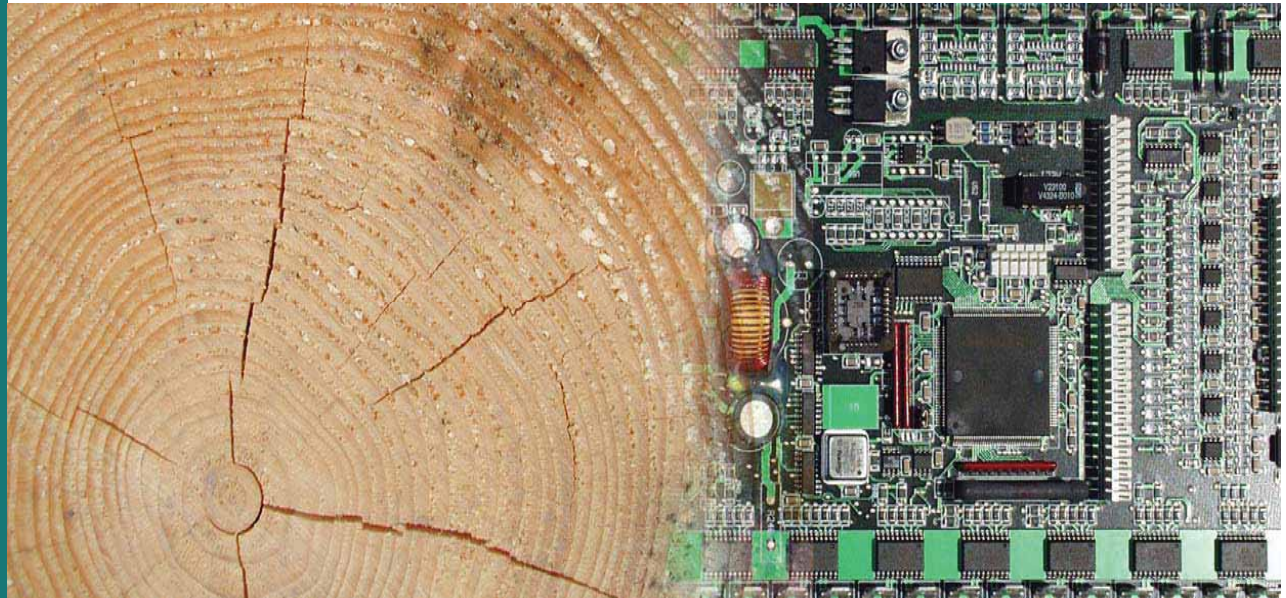
Log Scanning

Summary

Advantages of the Log Scanner:

- Feeding speed up to 780 ft/min (240 m/min)
- Every single log is measured accurately
- Lower costs compared to manual measuring of every log
- Most accurate measurement of
 - Length
 - Diameters
 - Volume
 - Taper
 - Sweep
 - Ovality
- Documentation (report & photograph) of every single log
- High level of transparency because of detailed reports
- Regulatory reporting of the Log Scanner calibration

MICROTEC
INNOVATING THE WOOD



MiCROTEC[®]
INNOVATING THE WOOD