
NI-DAQ™
DAQアシスタント



DAQ

20081370467L-0112

DAQ LabVIEW 7.xNI LabWindows™/CVI™ 7.x
 Measurement Studio 7.xDAQ NI-DAQmxDAQNI
LabVIEW SignalExpress 2.x

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- DAQ —NI-DAQmxDAQ
- LabVIEW —LabVIEWWVI
LabVIEWLabVIEW
- LabWindows/CVI Help —
 - **Using LabWindows/CVI**—
 - **Library Reference**—LabWindows/CVI
 - **Programmer Reference**—LabWindows/CVI
 - **Example Programs**—LabWindows/CVI
 - **Tools Library**—LabWindows/CVI

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- NI-DAQmx Measurement & Automation Explorer—
NI-DAQmxMeasurement & Automation Explorer (MAX)DAQ
SCXIPXISCCRTSIMAX
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- NI Measurement Studio Help —Microsoft Visual C++Visual
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- NI-DAQmx—National Instruments NI-DAQmx
NI-DAQmxNI → → **National Instruments** → **NI-DAQ**
- LabVIEW NI-DAQmx—DAQLabVIEW 7. xNI-DAQmx
DAQDAQ
LabVIEWNI-DAQmxLabVIEW

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→ →



monospace

Windows

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Windows

""National Instruments""

*?prog*programprogrammatically
progress

1?extnexttext

example AND (program OR VI)example
programexmaple VI5



- **AND—**
- **OR—**
- **NOT—2**
- **NEAR—**

- —
- —programprogramsprogrammatically
progress
- —

Windows

1.

2.

3.



1

4. **OK**

PDF

PDFPDFAdobe Reader

DAQ _____ LabVIEW LabVIEW SignalExpress
LabWindows/CVIMeasurement Studio DAQMAX

DAQ

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- _____
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- NI _____
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DAQ LabVIEW LabWindows/CVIMeasurement Studio7.
LabVIEW SignalExpress 2.x

x

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DAQmxMeasurement & Automation Explorer NI-
DAQmx API

NI-DAQmx
DAQ NI-
NI-DAQMA2

NI-DAQmx

NI-DAQmx
MAXMAX



LabVIEW 8.0LabVIEW

DAQ

DAQ

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LabVIEW

LabWindows/CVI Help

Measurement Studio

Help

NI-DAQmx

DAQ

DAQNIMAXDAQ

DAQ

DAQ_____

DAQ

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[LabVIEW SignalExpress](#)DAQDAQ

LabVIEWDAQ

DAQ

- DAQmx **DAQmx**
- LabVIEW 8.0LabVIEWMAX

→

- LabVIEW7.xLabVIEW **DAQ**
- DAQExpress VI VIVI



DAQExpress VIMAX

[DAQExpress VINI-DAQmx](#) DAQExp

LabVIEWDAQExpress VI

- LabVIEW 7.x → **NI-DAQmx**

LabVIEWLabVIEW NI-DAQmxLabVIEW

LabVIEWLabVIEW

DAQ

LabWindows/CVDAQ

DAQ Tools → Create/Edit DAQmx Tasks

Create/Edit DAQmx TasksMAXLabWindows/CVI

LabWindows/CVIMAX

_____MAX

LabWi

DAQmxLoadTaskTask NameNew TaskLabWindows/CVIMAX

DAQ .

MAXDAQ

DAQ


1. LabVIEW Real-Time
2. **NI-DAQmx**
3. DAQ
4. .
5. MAX



MAXDAQ

Measurement StudioDAQ

Measurement StudioDAQmxDAQmxMeasurement
Studio _____MAXDAQmx

1. DAQmx
2. →
3. **Measurement Studio** →
4. **DAQmx**
5. DAQmx **Open**
6. DAQmxMAX
 MAX
7. DAQ
.mx .mxDAQmxDAQNI

DAQ



LabWindows/CVIMeasurement StudioMAX

1. MAX

LabVIEW Real-Time

2. **NI-DAQmx** DAQ

LabVIEWLabWindows/CVIMeasurement Studio7.x DAQ

- LabVIEWLabVIEW Real-TimeDAQmxDAQ
DAQ
- LabVIEW 8.0MAX

→

3. LabVIEW7.x **DAQmxDAQ**

4. LabWindows/CVIMeasurement StudioDAQ **Add Existing**
DAQmx Global ChannelsMAX

5.

6.

- LabVIEWLabWindows/CVIDAQ **OK**
- Measurement StudioDAQ **File → Save**
- MAXDAQ



LabVIEW SignalExpressDAQ

LabVIEW SignalExpressDAQDAQLabVIEW SignalExpressDAQ

- 1.
2. → **DAQmx** → **DAQmx**
3. I/O
- 4.
5. DAQ

DAQ

1. I/O

2. 1

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4.

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5.

6. 1TEDSTEDS

7.

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1<Ctrl><Shift>

TEDS

I/O

1

NI-DAQmx

- 1.
2. **NI-DAQmx**
- 3.
- 4.
5. DAQIDID
6. **OK**

1



11

I/O

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- - NI-DAQmx 7.4
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 - _Dev1
- 256

LabVIEW

DAQLabVIEWMAX

MAX

MAX

NIMAX

LabVIEW

MAX

1. DAQmxDAQmx
- 2.
3. **DAQmxDAQmx**
4. DAQ
5. **OK**

LabVIEW SignalExpress

LabVIEW SignalExpress 2.5MAXMAXDAQ

MAXLabVIEW SignalExpressMAX

LabVIEW SignalExpress

LabWindows/CVI

MAX

Tools → Create/Edit DAQmx Tasks
MAX

→ NI-DAQmx MAX

Measurement Studio

MAX

MAX

.mxbDAQ

MAX

DAQMAX

- 1.
2. **NI-DAQmxNI-DAQmx**
- 3.
4. DAQ
- 5.



Note

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3.

4. **OK**

5.

DAQ _____ . NI-DAQmx
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NI-DAQmx NI-DAQmx
RTD

NI-DAQmx1 NI-DAQmx

NI-DAQmx

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- **DAQ—**
- **MAX—**
- **LabVIEW—DAQmx**

NI-DAQmx
DAQ

2.

3.

4. **DAQ**

5. **OK** **MAX**


LabVIEW—

1. DAQmx
- 2.
3. **DAQ**
4. DAQ
5. **OK**

MAX—

- 1.
- 2.
3. DAQ
- 4.

MAXDAQ

- **MAX**—
- **LabVIEW—OK**
 -  DAQExpress VIMAX
MAX
- **LabWindows/CVI—OK**
- **Measurement Studio**— →

[DAQExpress VINI-I](#)

MAXNI

 SignalExpressMAX

MAX

LabVIEW 7.x LabWindows/CVI 7.x Measurement Studio 7.x

LabVIEW LabWindows/CVI Help Measurement Studio
Help NI-DAQmx LabVIEW SignalExpress DAQLabVIEW
SignalExpress



LabWindows/CVI Measurement Studio

LabVIEW

1. DAQmxDAQmx
- 2.

LabVIEW SignalExpress

MAXLabVIEW SignalExpress 2.5

→ **MAX**]

 LabVIEW SignalExpress

LabVIEW SignalExpressDAQ

- 1.
- 2.

LabWindows/CVI

1. DAQmxLoadTask
2. **Task Name**<Enter>
- 3.

Measurement Studio

Project → Add New Item1

- MAXDAQmx Task Add New Item
- Visual C++DAQmxUserCodeMAXDAQmxUserCode Add New Item
- NET DAQmxUserControlMAXDAQmxUserControl Add New Item

MAX

DAQExpress VINI-DAQmx

DAQExpress VIDAQExpress VINI-DAQmx
MAX



LabVIEWDAQExpress VI

DAQExpress VINI-DAQmx

1. DAQExpress VI
2. DAQ
3. **OK**
4. NI-DAQmxDAQExpress VI

NI-DAQmx

DAQ

- 1.
2. DAQ
3. 1
- 4.

DAQ

1

NI 7.xMAX LabVIEW 7.xLabVIEW
SignalExpress 2.x LabWindows/CVI 7.x Measurement Studio 7.x
 LabVIEW 7.x
DAQ

NI3

- —VIVI

NI-DAQmx

- —
NI-DAQmx

→ → **National Instruments**

DAQDAQDAQ



- —LabVIEW



DAQExpress VI **NI-DAQmx**

DAQ

- [LabVIEW](#)
- [LabVIEW SignalExpress](#)
- [LabWindows/CVI](#)
- [Measurement Studio](#)

LabVIEW

LabVIEWDAQ

LabVIEW3

- —VI
- —I/O/VIVIVI



- —

LabVIEW

1. DAQmxDAQmx
- 2.
3. →

LabVIEW DAQExpress VI

DAQExpress VIVI NI-DAQmx DAQExpress
VI



DAQExpress VIMAX
DAQmx MAX

DAQExpress VINI-

LabVIEW SignalExpress

LabVIEW SignalExpressLabVIEWLabVIEW SignalExpress
VILabVIEW SignalExpress

LabVIEW SignalExpressDAQLabVIEWDAQExpress VI

LabVIEW SignalExpressExpress VI

- 1DAQ
- DAQ
- DAQ
- DAQ

Express VILabVIEW SignalExpress

LabWindows/CVI

LabWindows/CVIDAQ



LabWindows/CVI2

—

- —
- —DAQ DAQmxLoadTask



LabWindows/CVI

LabWindows/CVI

1. DAQmxLoadTask
2. **Generate DAQ Example Code**
- 3.
4. **OK**

LabWindows/CVI

DAQ .mxh

DAQDAQ3

Copy DAQ Task To Project MAX

-
- DAQmxLoadTask
-

Measurement Studio

Measurement StudioDAQ

Measurement Studio2

- —
- —DAQ DAQmxLoadTask



Measurement Studio

.mxh



DAQDAQmx
DAQDAQmx
DAQ

.mxh

.mxh

.NET DAQmx

DAQmx .cs.vb
.vb

.mxh

.cs

1.

2.

.mxh

3. .cs.vb

.mxhDAQ

.mxh



.mxh

View → Properties Window

Visual C++ DAQmx

DAQmx .h .cpp .mxh

Measurement Studio .mxhVisual C++ .mxhDAQ
.mxh

Measurement Studio

NI Measurement Studio Help

DAQ HTML

MAX NI-DAQmx

DAQDAQHTML

DAQ

HTMLHTML

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HTMLHTML
HTML

imagesMicrosoft Internet Explorer

MIOSCXI

- CB-11
- CB-27
- CB-37FH
- CB-37FV
- CB-50
- CB-68LP
- CB-68LPR
- CB-C68
- DAQPad-6015/6016
- PXI-4204
- PXI-4220
- SCB-100
- SCB-68
- SCXI-1300, 1303, 1304, 1308, 1313, 1314, 1314T, 1315, 1317, 1320, 1321, 1322, 1327, 1328, 1338
- TB-2705
- TB-2706
- TB-2725
- TBX-68

MAX

DAQ MAX NI-DAQmx

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MAX

2

- **DC**—

- —**AC**

- 1.

- 2.



SCXI-1124SUPPLYISINKISINK
GND



2 33D

1

ACDCAC

AC

-



SCXI-1126

--0.54.48

DCDC

RVDT

1RVDT

RVDTLVDT±30°70°360°

RVDTRVDT10ms70RVDT

$$I_{(A)} = V_{(V)} / R_{(\Omega)}$$

I *V* *R*

42020mA 4mA20mA

NI-DAQmxSCXI

NI-DAQmxNI-DAQmxAI
DAQmx

LVDT

LVDT LVDTLVDT

LVDT12DCDC

LVDT45LVDT45

1 1V1A 2422100Ω

$$R = V/I$$

R *V* *I*

Pa0 dB6070

dB110 dB150 dB

SPLLP

$SPL = 20 \log_{10} (p/pref)$

p Pa $pref$ 20 μ Pa

ACDCAC

με

11

1.

2.



3.

4.



5.



6.



SCXI-1520SCXI-1314PXI-4220SCXI-1121SCXI-1321
SCXI-1122SCXI-1322

SCXI-1520SCXI-1314PXI-4220

—

AI...

AI...

AI..

SCXI-1121SCXI-1321

—SCXI-1321

AI..

SCXI-1122SCXI-1322

—

AI..

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1

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RTD
RTD2,000

10,000Ω/200Ω/ °C

300°C

RTD

2

NI-DAQmx-

$$\frac{1}{T} = A + B(\ln(R)) + C(\ln(R))^3$$

T *R* *ABC*

RTD RTD2,000

10,000Ω 200Ω/ °C

300°C

RTD

2

NI-DAQmx-

$$\frac{1}{T} = A + B(\ln(R)) + C(\ln(R))^3$$

T

R

ABC

RTD

RTD

RTDRTD1RTDDAQRTD

2 DCAC

DC

AC AC

DAQ

DAQ

NI-DAQmx

EMTTL-TTL2

- LOW = 0 +0.8 V
- HIGH = +2 +5 V

DAQ_____

NI-DAQmx

EMTTL-TTL2

- LOW = 0 +0.8 V
- HIGH = +2 +5 V

DAQ

EMTTL-TTLHIGHLOW2

LOW = 0 +0.8 V

HIGH = +2 +5 V

LED

DAQ_____

EMTTL-TTL2

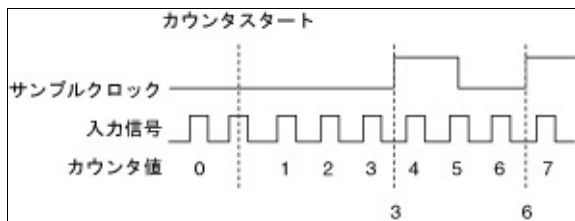
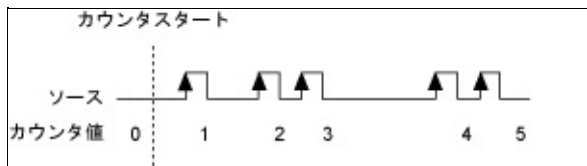
- LOW = 0 +0.8 V
- HIGH = +2 +5 V

LED

HW

/VI

5



/TTLLOWHIGHLOWHIGHHIGHLOW
HIGHLOW

3

- —
- **HIGH**—HIGH5V
- **LOW**—LOW0V

DAQHIGHLOW

LOW LOWHIGHHIGHLOWLOWHIGHLOW
HIGH HIGHLOWLOWHIGHHIGHLOWHIGH

NI-DAQmx

Hz) = /

100 MHz 500 200 kHz

20MHz 100kHz NI-DAQmx

1

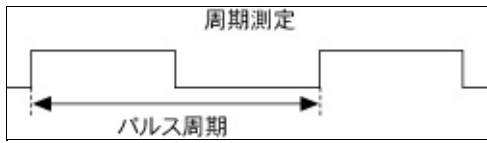
12

NI-DAQmx

1

2 2

2



$$) = \quad /$$

$$1$$

20MHz 100kHz NI-DAQmx

12
NI-DAQmx

1

2 2

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NI-TIO

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90AB

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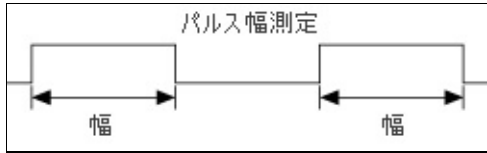
VI/ /VI

NI-TIO X1X2X4

90ABZNI-TIO

/ZZABZZZ/

VI//VI

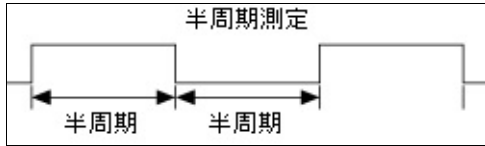


$$) = \quad /$$

1

20MHz100kHzNI-DAQmx

HIGHLOW

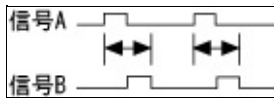


) = /Hz

HIGHLOW

20MHz100kHzNI-DAQmx

___ 1A1B



$$= \quad / \text{Hz}$$

2

NI-DAQmx

2

2TTL2

TTLNI-DAQmx

/

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/VI

= /

Hz = /



TTL2

—

NI-DAQmx
0.006Hz50kHz

24100kHz

40.024Hz200kHz

= /

= /



/ A B C D E F H I L M N P R S T U V W

| | |
|-------|-----------|
| | |
| n | 10^{-9} |
| μ | 10^{-6} |
| m | 10^{-3} |
| k | 10^3 |
| M | 10^6 |

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| % | |
| + | |
| - | |
| Ω | |
| ° | |

A

ADC Analog-to-Digital Converter

ADE Application Development Environment
LabVIEW
LabWindows/CVI

AI

AO

API Application Programming Interface
VI

B

BIOS Basic Input/Output System BIOS PC BIOS

C

cDAQ CompactDAQNI cDAQ-9172

CH

CMRR Common-Mode Rejection Ratio dB

CompactDAQ C

C // CCompactDAQ
CompactRIONI USB-9

D

DAC Digital-to-Analog Converter

DAQ —

DAQ

DAQ DAQPCMCIAUSB1394Firewire
DAQPad SCXIDAQ

dB $20 \log_{10} V_1/V_2$

DC Direct Current

DIO Digital Input/Output

DMA Direct Memory Access

DSUB D-SubminiatureD-

DUT Device Under Test

E

E

F

FIFO First-In-First-Out FIFOADC/DAC

H

Hz /

I

I/O Input/Output

IEEE P1451.4 IEEE TEDSEEPROM

IEEE P1451 IEEE TEDSTEDS

IRQ Interrupt ReQuest

ISA Industry Standard ArchitecturePC

L

LED Light-Emitting Diode

LSB Least Significant BitA/DD/A

LVDT Linear-Voltage Differential Transformer LVDT1122 1AC
AC2 220

M

MAX Measurement & Automation Explorer

MIO Multifunction I/OI/OI/O MIO
DAQ EMIO

M

N

NI-DAQ 2NI-DAQNI-DAQmxNI-DAQAPI
7.x

NI-DAQ NI NI-DAQLabVIEWADE
NIVI

NI- VINI-DAQ NI-DAQmxLabVIEW
DAQmx LabWindows/CVIMeasurement StudioDAQNI-DAQ
VIDAQAPINI-DAQ

NI- MAX **NI-DAQmx** NI-DAQmx
DAQmx

NRSE NonReferenced Single-EndedNRSE

P

PCI Peripheral Component Interconnect
ISAEISA PCIPC
132M/

PCMCIA Personal Computer Memory Card International
AssociationPC

PFI Programmable Function Interface I/O

PID Proportional Integral Derivative//

PWM

PXI PCI eXtensions for Instrumentation
PCICompactPCI
PXI1997PXI Systems Alliance

PXI PXIPXI DAQ PCI DAQRTSI

R

RSE Referenced Single-Ended

RTD Resistance Temperature Detector

RTSI Real-Time System IntegrationDAQ PXI
DAQPXI

RVDT Rotary Variable Differential Transformer

S

S/s

s

S

SCC Signal Conditioning Component DAQI/O

SCXI Signal Conditioning eXtensions for Instrumentation PC
SCXI

STC System Timing Controller

T

TCR Temperature Coefficient of Resistance 0C100C1

TEDS Transducer Electronic Data Sheet IEEE 1451.4

TEDSID

TEDSTEDS

www.ni.com/pnp

TEDS TEDSTEDS RTD/TEDS

II 12/1

TEDS 2TEDS

I 12/1

TTL Transistor-Transistor Logic HIGH/LOW 2

U

USB //USB NI USB-9201NI USB-9211NI

DAQ USB-9215NI USB-9221NI USB-9233NI USB-9237 USB DAQ

V

V

VI

VISA Virtual Instrumentation Software Architecture

W

WDT

TTL

OS

FIFO

/ 1648 2

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RVDT

NI-DAQmx /VI

LabVIEW

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2

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DAQ

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1/ 10 S/s110

NI-
DAQ NI-DAQ NI-DAQNI-DAQNI-
DAQmxNI-DAQ 6.9

I/O

TTL

AO

I/O I/O I/OI/O

II/O I/O23

I/O I/O

TEDSEEPROM

TEDS

1

MI/OMIOSCXIDAQ

NI-DAQmx

VI

N^2 $N - 1$ N^0

NI-DAQmx1

10%90%
90%10%
DAQ

1. — 18
2. — NI-DAQmx
NI-DAQNI-DAQmx NI-
DAQMAXNI-DAQmxMAX
3. — 1124
NI-DAQmxVI

MAX

DAQ

- 1.
- 2.

TTL —

1. 1
2. DAQ

1. —
2. —VI

I/O

DAQ

-5+5V

LabVIEW

I/O PCISAPCI

I/O

I/O

SCXI

ADC

FSR

ADCDAQ ADCDAQADCDAQ

10

1. —
2. —VI

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TEDSTEDSTEDS
DIP

I/O

ADC

8-32- E18-

E818

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SCXI11DAQSCXI

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1 SCXIPXI

0+10V

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| | 31 (0) 348 433 466 |
| | 800 433 3488 |
| | 82 02 3451 3400 |
| | 1800 226 5886 |
| | 41 56 2005151 |
| | 46 (0) 8 587 895 00 |
| | 34 91 640 0085 |
| | 386 3 425 42 00 |
| | 662 278 6777 |
| | 886 02 2377 2222 |
| | 86 21 5050 9800 |
| | 420 224 235 774 |
| | 45 45 76 26 00 |
| | 49 89 7413130 |
| | 90 212 279 3031 |
| | 0800 553 322 |
| | 0120-527196 / 81 3 5472 2970 |
| | 47 (0) 66 90 76 60 |
| | 358 (0) 9 725 72511 |
| | 33 (0) 1 57 66 24 24 |
| | 512 683 0100 |
| | 32 (0) 2 757 0020 |
| | 55 11 3262 3599 |
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| | 1800 887710 |
| | 27 0 11 805 8197 |
| | 01 800 010 0793 |
| | 961 (0) 1 33 28 28 |
| | 7 495 783 6851 |