

LAN 10/100  
audio ethernet  
module  
OEM 2.0



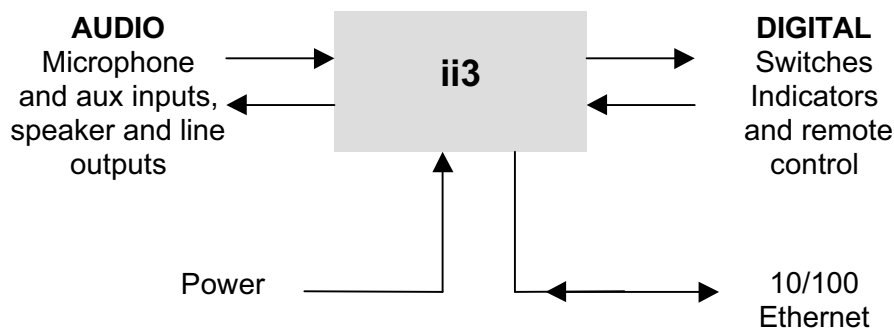
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# OVERVIEW

Digital Acoustics IP (Internet Protocol) Intercom modules provide a functional audio equivalent to the basic "push to talk" intercom. Simply connect the module to a 10/100 Ethernet connection and communicate to a host server PC by voice.

- Talk to/from any station to host PC server
- High quality, clear transmit and playback audio
- Simple operation utilizes push buttons for commands
- Fixed and automatic and DHCP compliant IP assignment
- Hands-free listen mode at stations
- Directly connects through 10/100 ethernet system
- Highly scalable and seamless expansion
- Field upgradeable OS using internal *Flash* memory
- TalkMaster™ host software access and controls ii3 clients
- Application SDK for Windows® available for developers
- Perfect for business, industrial and consumer applications



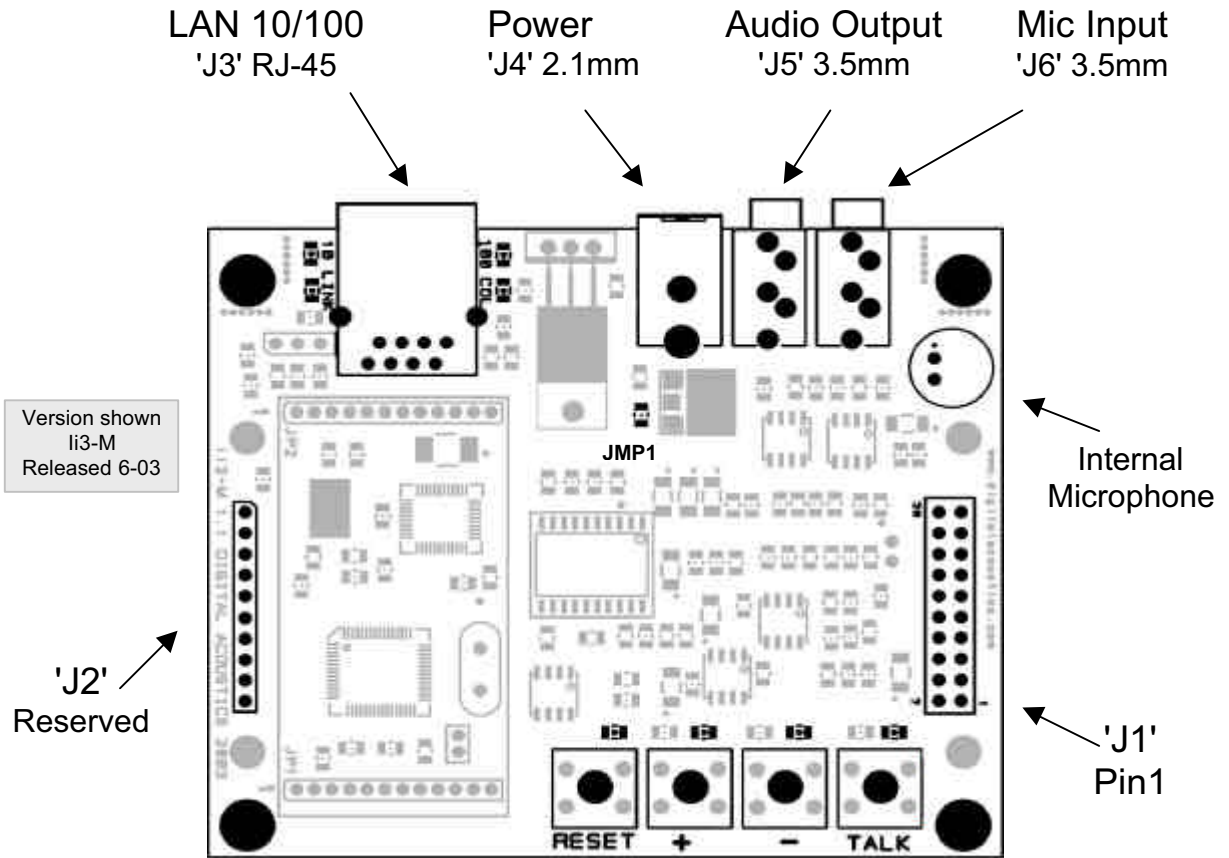
Audio features include:

- Audio modes compatible with PC multimedia PCM, WAV and uLAW codecs
- High quality, internal low noise microphone amplifier with dynamic gain, AGC and compression
- Buffered audio line out and internal 2 watt speaker amplifier
- Digital volume control, adjustable locally and remotely.
- Low latency, with optimized and adjustable buffering

# SPECIFICATIONS

<b>Items</b>	<b>Specification</b>
Hardware Protocols	TCP, UDP, IP, ARP, ICMP, Ethernet MAC
Network Interface	10/100 Base-T Ethernet (Auto detection)
Command protocols	Proprietary, available under NDA
SoftSwitch capabilities	User defined, programmable, bi-directional
SoftSwitch interface	3 non-isolated 5v HC-CMOS type I/O
Audio Rate	80khz with adjustable 500 ms buffers
Audio Resolution	PCM-8bit and uLAW-16 bit 8bit
Audio Sample Rate	8 kHz (Voice band)
Audio Buffers	4KB TX and RX
Internal Amplifier	2w Max @ 4 ohms
Microphone sensitivity	-42db WM-034CY integrated electret
Microphone AGC	37db with limiting and automatic leveling
PHY Interface	RealTek RTL8201BL single-port PHYceiver
Temperature	0'C ~ 70'C (Operating), -40~85'C (Storage)
Humidity	10~90%
Power	7.5-9 VDC ext. or 5 VDC (300MA min)
Connector type	2x10 .1" Pin header array
Size	92mm x 77mm x 17mm

# INTERCONNECT DESCRIPTION



+ Speaker -	● ●	19 -- Speaker -
Ground --	● ●	17 -- Aux Line In
n/c --	● ●	15 -- Ground
Reserved --	● ●	13 -- Audio Line Out
Reserved --	● ●	11 -- Reserved
GPIO 3--	● ●	9 -- GPIO 2
GPIO 4--	● ●	7 -- GPIO 1
Ground--	● ●	5 -- 7.5-9 vdc
+5 vdc --	● ●	3 -- TALK
Reserved --	● ●	1 -- Status LED

## J1 User Interface

# INTERFACE CONNECTION SUMMARY

PIN	Signal	Description
J1-1	LED status	Status indicator output, LED cathode connection
J1-2	Reserved	Reserved signal (low level program pin)
J1-3	TALK	Push To Talk digital switch input.
J1-4	5 volt DC	5 VDC regulated external power input <sup>1</sup> (see <i>detail</i> )
J1-5	Power DC	7- 12VDC with JMP1 installed (default),
J1-6	GND	System ground
J1-7	GPIO1	General Purpose I/O. Default Volume Up
J1-8	GPIO 4	General Purpose I/O
J1-9	GPIO 2	General Purpose I/O. Default Volume Down
J1-10	GPIO 3	General Purpose I/O. Default System Reset
J1-11	P11	External connection pad for custom solutions
J1-12	P11	External connection pad for custom solutions
J1-13	Line Out	Line input audio signal.
J1-14	Reserved	No connection
J1-15	Ground	Vdd system ground
J1-16	N/c	Not used
J1-17	Line Input	Auxiliary Line Input
J1-18	Ground	Vdd system ground
J1-19	Speaker +	Speaker output 2w max (4-8 ohm), floated
J1-20	Speaker -	Speaker output 2w max (4-8 ohm), floated

# INTERFACE CONNECTION DETAIL

## DIGITAL CONTROL AND STATUS

LED	J1-1	Active low 5v digital output. LED requires current limited (1000 ohm) cathode connection with anode to Vcc. Maximum sink current 6ma.
TALK	J1-3	SPST contact switch closure to ground enables audio Microphone and/or Line In transmission to the network.
GPIO1	J1-7	General Purpose I/O (selectable output, OEM specified). Default operation is Volume Up adjustment
GPIO2	J1-9	General Purpose I/O (selectable output, OEM specified). Default operation is Volume Down adjustment
GPIO3	J1-10	General Purpose I/O (selectable output, OEM specified). Default operation is RESET (active low to reset)
GPIO4	J1-8	General Purpose I/O (selectable output, OEM specified).

## ANALOG AUDIO

MIC INPUT JACK	J6 3.5MM	External Microphone Input. Use of this jack automatically disconnects the onboard electret microphone. See following section for recommended microphone specifications
AUDIO OUT JACK	J4 3.5MM	External audio out jack. Capable of driving 2 watt 4/8 ohm speakers or external amplifier. Use of this jack interrupts connection J1-20 (and disconnects speaker audio from J1).
LINE OUT	J1-13	1 v p/p signal. Fixed level, capable of driving 10Kohm. Buffer and transformer couple for cable lengths >10meters
LINE IN	J1-17	Auxiliary Line Input 1 v p/p 10k impedance
SPEAKER	J1-19 J1-20	Speaker output 2w max (4-8 ohm), floated For best results use 500ma power supply if using 4 ohm speaker

## POWER SOURCE

POWER JACK	J4 2.1 MM	Unregulated DC input 7.5VDC to 9VC 300ma. Use 500ma supply when utilizing onboard speaker amplifier and 4 ohm speakers. POSITIVE TIP polarity <i>REQUIRES JMP1</i>
POWER	J1-4	Same signal connection as power jack J4 (above)
5 VDC IN	J1-5	Optional 5 VDC <i>regulated</i> external power input. <sup>1</sup> Note 1: <i>Requires removal of jumper JMP1</i>
GROUND	J-6/15/18	System ground



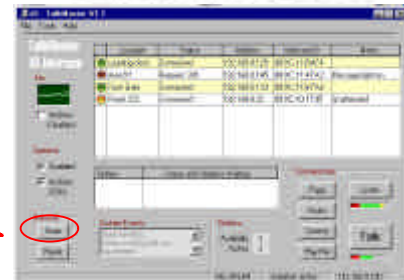
# CONFIGURATION AND IP ADDRESSES

TalkMaster™ LE software downloads are available online  
 Access [www.digitalacoustics.com/talkmaster](http://www.digitalacoustics.com/talkmaster) for downloads  
 and mode information.

## Talk Master™

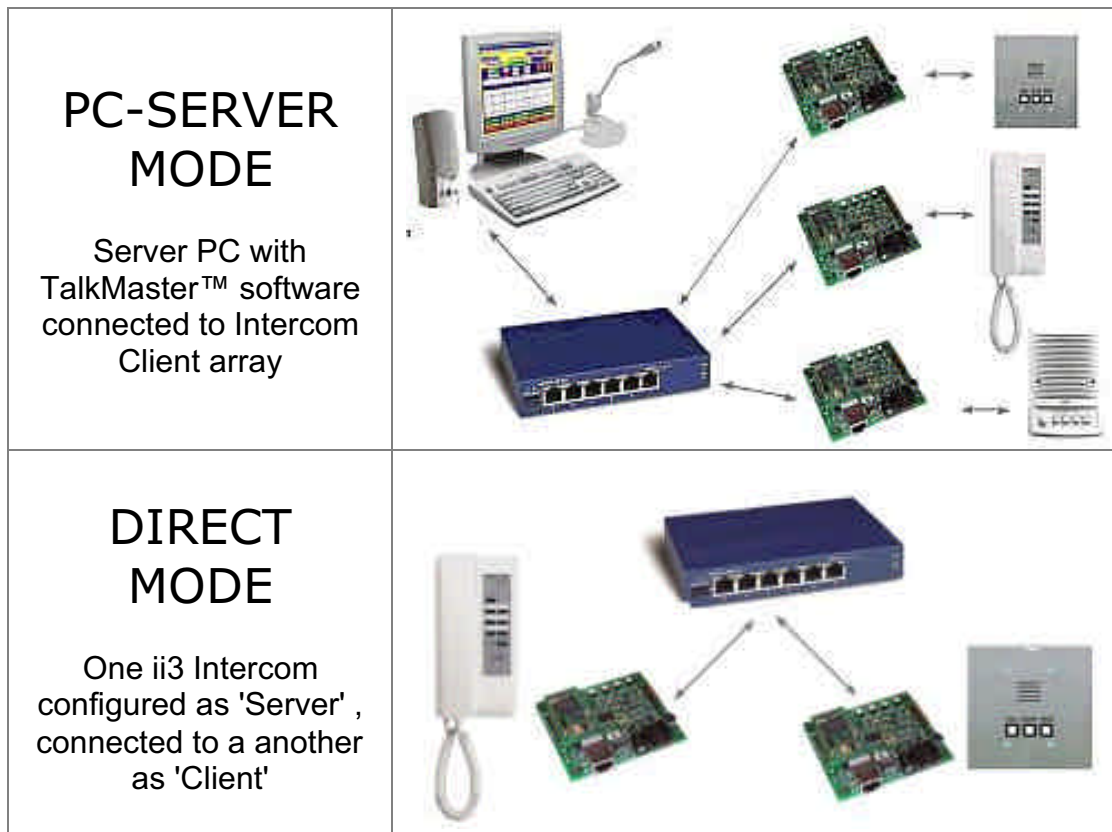
Quick reference:

1. Install and start TalkMaster™ software
2. To configure your intercoms, **Scan All**
3. Select and assign intercoms IP addresses
4. Press **Exit**



*Refer to the [TalkMaster User Guide](#) for more information  
 on setup and configuration options!*

# TYPICAL SYSTEM CONFIGURATIONS



# LED INDICATORS

4 LED indicators are dedicated to the RJ45. They indicate LINK status, 10/100 MHZ connection rate and collision (COL) detection (2 IP addresses set the to same value).

4 additional LEDs are available onboard for diagnostics. Each LED is connected to a specific pin the 20 pin header J1.

- "LD1" indicates GPIO-3 (J1-10) digital state
- "LD8" indicates GPIO-2 (J1-9) digital state
- "LD9" indicates GPIO-1 (J1-7) digital state
- "LD10" is tied to the STATUS LED (J1-1)

Operational Mode	LD10	LD9	LD8	LD1
Normal operational mode. TalkMaster is active. Intercom can communicate.	ON	ON	-	-
LAN connection is inactive. The RJ45 may be unplugged, or LAN lost power.	FLASH	OFF	-	-
Cannot connect, or if DHCP IP is enabled, address is not being assigned (Beeps will occur at 60 second intervals)	FLASH	ON	ON	ON
TalkMaster™ Server software is not running or not set to communicate.	FLASH	ON	ON	-
TalkMaster software at the server has "Scanned" for intercoms in the Configuration Mode utility setup	FAST FLASH	ON	ON	-
Connection lost while TalkMaster was active on	FLASH	OFF	ON	-
Receiving audio. The server software (TalkMaster™) / PC microphone is on.	ON	ON	-	FLASH
Sending audio. Talk button is pressed or server has engaged "listen" mode.	ON	ON	-	ON
Intercom is in "Server" mode, waiting for a client to request connection (Active LED flash alternates 1sec fast - 1sec slow)	DUAL FLASH	-	-	-
Local "Monitor" button has been depressed. Microphone is set to constant "Talk" mode for monitoring	ON	ON	ON	ON

## INTEGRATED SWITCHES

4 onboard single pole micro-switches are available for convenient test and demonstration. Buttons marked "+", "-" and "Reset" correspond to GPIO-1 (J1-7), GPIO-2 (J1-9) and GPIO-3 (J1-10) respectively. The "TALK" micro-switch is in parallel with J1-3

## EXTERNAL MICROPHONE SELECTION

ii3 supports high quality *voiceband* audio. Integrated AGC and limiting amplifiers are included to support a wide range of microphone inputs. A low cost, electret microphone (\$1usd) will have similar audio intelligibility as compared to more expensive "professional" microphones (\$10-\$50usd). When mounting microphones in external housings care should be taken to provide a vibration and moisture free environment. Isolating the microphone at a distance from the speaker location will improve performance and reduce acoustical feedback

Some microphones tested for compatibility with ii3 include:

Panasonic	WM-034CY (uses YPM-CH009 rubber mounts)
Horn Industrial	EM9765P-422
Emkay/Knowles	MD9745APZ-F

(available from [www.digikey.com](http://www.digikey.com) and other distributors)



## EXTERNAL ENCLOSURES

May be mounted in virtually any external plastic or tamper-proof metal enclosure that provides isolation from environmental extremes and protected from the moisture. Contact Digital Acoustics for information on our pre-fabricated ii3 enclosures and wall-mount faceplates.

# SOFTWARE SUPPORT

## ii3-TalkMaster™ software



- Control and detection for stations
- Audio access for all ii3 intercoms with Master call to page all stations
- Program ii3 intercom internal OS/Flash memory
- Pop-up screens for identifying incoming station ID and audio
- Utilizes PC Multimedia microphone/speaker for access to intercoms
- Integrated UDP polling on to automatically detects all stations
- API available for easy custom GUIs with sample program (VB6)
- Windows® 98, Me, 2000, XP, Server 2003



TalkMaster™ software manuals and downloads are available at [www.digitalacoustics.com/talkmaster](http://www.digitalacoustics.com/talkmaster)

## iTalk/X SDK development software

## iTalk/XActiveX

iTalk/X provides complete access to the functions used in TalkMaster™, making it easy to write TCP/IP server software for Digital Acoustics' ii3 Intercom Series. iTalk/X is available as an ActiveX control for Visual Basic and Visual C++ applications, or and other GUIs that support ActiveX.



	Location	Status	IP Address	Intercom ID	Notes
<input type="checkbox"/>	Gate 201	Connected	192.168.0.100	101B02	
<input type="checkbox"/>	Treatment plants	Connected	192.168.0.175	1019C0	Audio call listening
<input type="checkbox"/>	Station 321	Connected	192.168.0.183	1019D3	
<input type="checkbox"/>	Room 222	Connected	192.168.0.113	101B23	
<input type="checkbox"/>	Gate 12	Connected	192.168.0.172	1019BA	

# II3 LOW LEVEL COMMANDS

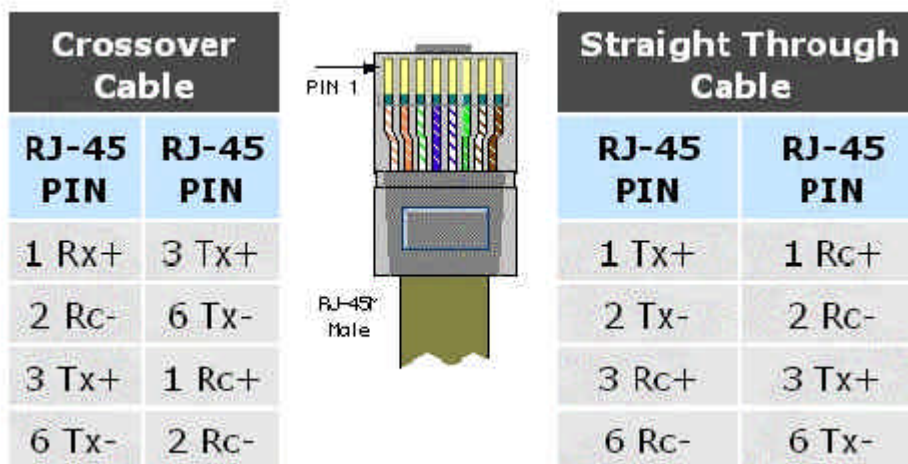
II3 command structure is available under Non-Disclosure for selected OEM applications.

# NETWORK WIRING USING CAT5

Ii3 series products connect to network hubs and switches using standard *Straight Through* wiring, similar to PC connections and do not support auto-detection. No special connections or cabling changes are needed under normal operating environments.

## Crossover Cable Connections

Use a Crossover cable ONLY when using 2 ii3 intercoms in DIRECT CONNECTION (Server/Client) or when using a PC to single ii3 intercom WITHOUT a hub/switch interconnect.



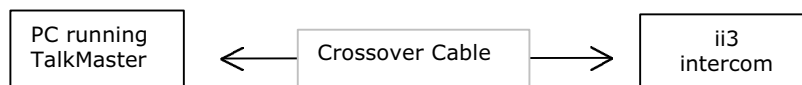
Cat-5 Wiring reference

# FIRMWARE OS UPGRADES

All ii3™ intercoms use internal *Flash* memory. Operating system (OS) and firmware may be upgraded in the field to include new revisions or custom options. TalkMaster™ software is required to enable and program access the Flash memory upgrade feature.

# TROUBLESHOOTING

- Verify power connections. The "Active" LED on should be on or flashing.
- Refer to LED Indicator section earlier in this manual for valuable diagnostic information.
- If you cannot detect ii3 units when you SCAN then be sure to verify that the LINK LED is on and TalkMaster is running on the SAME network.
- If you have multiple network cards on this PC verify that intercoms are connected to the system that is using this computer's IP #. Verify that your connection is on the SAME network that is running TalkMaster.
- ii3 Intercoms may operate across some firewalls or specific VPN's. They will need to be configured locally (for setup) and will need to be assigned correct STATIC IP addresses for correct detection.
- If using DHCP addressing try assignments using static IP addresses.
- If you hear beeps try re-scanning a few seconds after the beep to override DHCP addressing if you think that the intercoms are set for DHCP and are running on a non DHCP network.
- If you cannot detect any intercoms using the TalkMaster SCAN ALL utility screen try directly connecting the PC (running TalkMaster) to the ii3 intercom *using a crossover cable* (disconnected from the network).

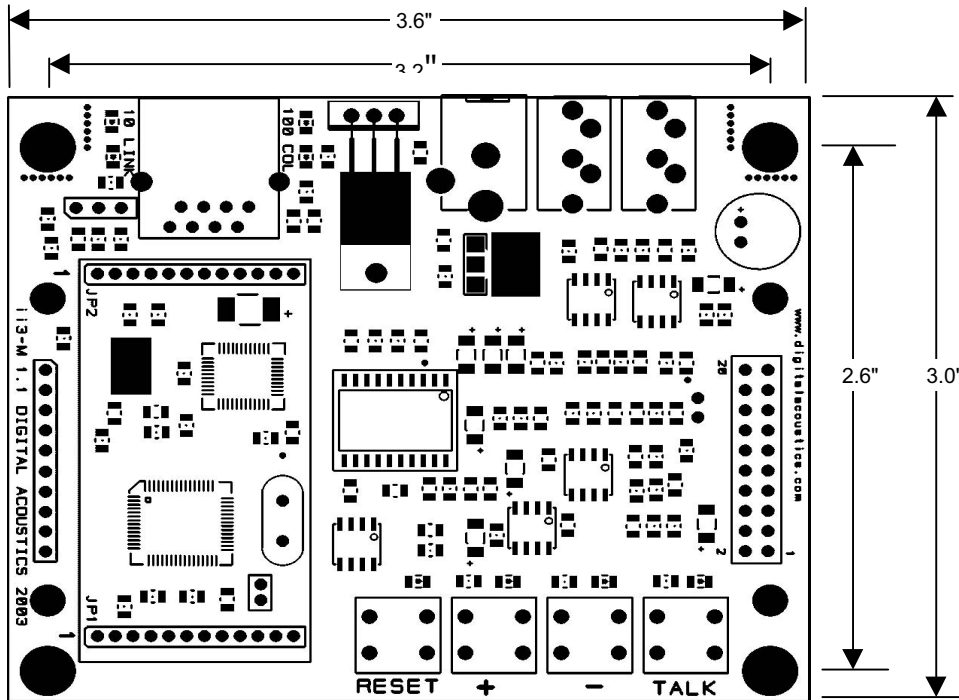


- Refer to the TalkMaster Software Manual for additional diagnostic techniques and troubleshooting tools.

# TECHNICAL SUPPORT

Information online [www.digitalacoustics.com](http://www.digitalacoustics.com)  
Email [techsupport@digitalacoustics.com](mailto:techsupport@digitalacoustics.com)  
Telephone +1 (203)-227-9700 M-F 9-5

# PHYSICAL DIMENSIONS



# # #

Digital Acoustics Corporation 1 Compobeach Road, Westport, CT 06880 U.S.A.

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