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EIFFEL DISPLAY UNIT

This document is applicable to firmware version **V4.00**

USAGE NOTICE

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Product models

Model Number	Model No. Description	Salient features
Eiffel AR11V0	Single channel air input ,Column display unit	**Base model** • Red digits 0.36". • Two relays (Accept, Reject) • No RTC • No internal storage • No Auto-offset correction port.
Eiffel AR11V1	Single channel air input, Column display unit	**In addition to base model** • 2.8" TFT color display • Up to 10500 records can be stored internally, and a second option up to 5 lakh records can be stored with SPC. • Internal RTC • Three relays (Accept, Reject, Rework). • Auto offset correction port. • Auto-correction script support on RS232 • Auto Save and Auto Sense facility.
Eiffel AR11V2	Single channel air input, Column display unit	**All Features of Eiffel AR11V1** • Built in Air Saver
Eiffel PR11V0	Single channel probe input, Column display unit.	**Base model** • Red digits 0.36". • Two relays (Accept, Reject) • No RTC • No internal storage • No Auto-offset correction port.
Eiffel PR11V1	Single channel probe input ,Column display unit	**In addition to base model** • 2.8" TFT color display • Up to 10500 records can be stored internally, and a second option up to 5 lakh records can be stored with SPC. • Three relays (Accept, Reject, Rework). • Auto offset correction port. • Auto-correction script support on RS232 • Auto Save and Auto Sense facility.

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1. Introduction

The Tri-color bar graph along with the 6 digit 7 segment display is an easy tool for the operate to improve productivity. The user can set it for measurements in comparative mode. The tri-color bar changes color between green, red and yellow depending on the component status- **ACCEPT**, **REJECT** and **REWORK**. The tolerance values are superimposed on the bar for operator's assistance. Advanced microcontroller based hardware along with a very simple to understand menu makes it very user friendly.

Flexibility in settings makes the column a real versatile tool for quality checking for mass production of work pieces. The Display unit are mostly used for measuring cylindrical work piece features such as bores and shafts diameters. It is measuring technique that performs dimensional and geometric checks of the part.

2. Features

- Red digits 0.36".
- Up to 10500 records can be stored internally, and a second option up to 5 lakh records can be stored with SPC.
- Metric/Inch measurement unit.
- Static /Dynamic reading.
- The tri-color bar changes color between green, red and yellow depending on the component status- **Accept** /**Reject** /**Rework.**
- Bar graph ranges from 10,25, 100, 250 and 500.
- Built-in real time clock. Low battery warning feature for timely replacement of battery.
- Built-in air saver feature (This feature can be enabled or disabled according to the requirement).
- Auto correction (This feature can be enabled or disabled according to the requirement).
- Rejection BIN interlock (This feature can be enabled or disabled according to the requirement).
- Up to 16 manually selectable programs.
- 0.1µm, 0.2µm, 0.5µm, 1µm, 2µm, 5µm, 10µm Least count options
- Absolute/relative measurement.
- RS232 for computer connectivity.
- AutoSave and Auto Sense facility.
- Additional RS232 serial port for auto-correction communication or connecting IO expansion board.

3. Specification

a. Functional specifications

- Communication settings: RS232 interface, no parity, 8 data bits, one stop bit.
- Baud rate: Settable as 4800, 9600, 19200, 38400, 57600(Factory default is 19200).
- Resolution options for probe: 0.01micron, 0.1micron, 0.5micron, 1micron.
- Measurement range for probe: +/-1mm, +/-1.5mm, +/-2mm, +/-2.5mm, +/-3mm.

b. Electrical specifications

- Power supply: 100VAC to 265VAC, 50/60Hz.Fused with 1A slow blow glass fuse. A stable earth point is must for proper operation of the device.
- Probe excitation: 2.5Vpp sine wave. 10 KHz for full bridge LVDT and 13 KHz for half bridge Tesa compatible probes. (Other factory options available on request).
- Output: 3 relay outputs.

c. Performance specifications

Following performance specifications have been identified at test lab when all the power supply specifications and operating conditions are at nominal values. These values may vary depending upon the field conditions. Proper care must be taken when high precision gauging is required.

- **Accuracy**
  ±0.1% within linear operation of inductive probe (1micron over the range of 1mm).
- **Drift**
  0.3micron over a period of 1hour.
- **Repeatability**
  After power cycle: 0.2micron
  After mechanical movement: 0.2micron.
- **Stability**
  ±0.15micron of nominal measured value at fixed position.
- **Maximum sampling time**
  For inductive probe: 1mSec (1000samples per second).
- **Warm-up time**
  The device must be allowed to stabilize for at least 60seconds before actually using the measurement reading from the connected probes. Although instrument requires much less time to stabilize, it is good practice to allow some spare time after power on. The warm-up delay may not be required when instrument is powered off and then on within short time.

d. Mechanical specification

- 180mm (L) X 60mm (W) X 530mm (H)

4. Keypad functionality

- There are six keys on keypad

I. UP (^) Arrow Navigation Key

This key is used for scrolling options when entering system settings mode. This key is also useful when entering digit values into the program setting mode.

II. Right (→) Arrow/NEXT Navigation Key

To move to the next system setting option without saving the changes made while in the system settings mode, use this key.
This key is also useful when you are in the program setting mode. When entering values for different parameters such as LSL, USL, nominal value, higher master, lower master, etc. While entering digit values, use this key to move from the left decimal place to the right decimal place.

III. SET key

This key is used to enter into the system setting mode. For entering into the system setting mode first turn off the device press and hold “SET” key then turn on device and hold the set key until you see on screen message “SETT”.

IV. ENT key

This key has dual functionality. When in setting mode, the 'ENT (enter)' key is used to enter the setting mode, save the selected values of the current option, and move to the next option. When in measurement mode, the 'ENT (enter)' key is used to transmit the current measurement data to the PC via serial communication.

V. M1 key

M1 key is used to enter mastering mode. Entering into mastering, press the M1 key first. The message shown on screen 'PLACE PLUG IN HIGHER MASTER.' After placing the plug into the higher master, press the 'M1' key to save the M1 master value.

VI. M2 key

The message shown on screen 'PLACE PLUG IN LOWER MASTER.' After placing the plug into the lower master, press the 'M2' key to save the M2 master value.

5. Screen functionality

- **System Setting**

This is menu where you can configure your device. For entering into system settings mode, turn off the device and press and hold the "SET" key and turn on the device. Press the 'SET' key until it shows 'SETT', then press the 'ENT' key after it shows 'UNIT'.

I. MEASUREMENT UNIT

This is the measurement unit selection option.

- **MM- (millimeter)**-Select mm to display the final results in millimeters

- **Inch-**Select inch to display the final results in inch

II. COMMUNICATION BAUD RATE

Using this option, select the baud rate for the communication between the display device and the computer. The communication baud rates are 4800, 9600, 19200, 38400, and 57600.

- **4800**

III. BUZZER STATUS

This feature provides you audio indication on key press.

- **ON**.

- **OFF**

IV. AUTO SENSE

The auto-sense concept in multigauging refers to the ability of the gauge to automatically detect the dimensions of the part being measured.

- **ON**
  If the auto sense is on, the sense delay and auto save screens will appear.

SENSE DELAY

Sense delay can be set from 1 second to 10 seconds. The part's dimension is measured automatically based on the set delay.

AUTO-SAVE DELAY

Auto save delay can be set from 1 seconds to 10 seconds or can be off. The part's dimensions are automatically saved according to the set delay.

- **OFF**
  If the auto sense is off, the sense delay and auto save screens will not appear.

V. DEVICE ID

This feature provides you to manage or identify your display device. You can give device identification number for you ease. This device id is recorded into each transmitted data frame, using this device id you can bifurcate particular device data from your database. You can set minimum “01” and maximum device id is “25”.

VI. DATA TRANSFER

This feature provides you facility to transmit stored measurement data to the PC via serial communication for analysis or report generation. The internal storage capacity has 10500 records, but if there are more, new records will override the older ones

- **YES**
  To send data, select 'YES' and wait.

After successfully transferring data, the screen displays 'transfer done'.

- **NO**
  If the data is not sent, select 'NO'.

VII. DATA CLEAR

This feature provides you to clear all you recorded measurement data permanently. Once you clear your all data there is no way to get it back. So be careful when you clear data.

- **YES**
  To clear data, select 'YES' and wait. Data will be successfully cleared.

- **NO**
  If the data is not clear, select 'NO'.

VIII. AIR TURN OFF DELAY

The air turnoff delay can be set or disabled.

IX. OPEN COUNT

To measure the open plug count, remove the plug in master then show the ADC count and this ADC count enter here

X. DEVICE NAME

- **Program Setting**

Whenever you turn on the device you will get only two options on screen, ADC count and Manual program select. You can switch between options by pressing "NEXT→" Key.

I. ADC COUNT

Shows the ADC count readings on the seven segment LED display.

II. MANUAL PROGRAM SELECT "01"

Using this option, you can load the parameters value for any program. For selecting program scroll up using "^UP" arrow key and press "TX/ENT" key. After entering into program settings you will get following parameters.

III. RESULT DISPLAY LC

- When metric unit is selected
  0.0001mm,0.0002mm.0.0005mm,0.001mm,0.002mm,0.005mm,0.010mm.
- When Inch unit is selected
  0.00001",0.00002",0.00005",0.0001",0.0002",0.0005",0.001".

III. SPECK VALUE

User need to enter speck value of the components to be used for measurement. Speck value is used for showing measurement result in absolute mode only. For relative display mode, speck value is not required.

IV. USL

This is upper specified limit of the dimensional measurement. When measurement value is above this limit, the component is for rework or reject depending upon direction.

V. LSL

This is lower specified limit of the dimensional measurement. When measurement value is below this limit, the component is for rework or reject depending upon direction.

VI. MASTERING TYEP

- **DOUBLE**
  when two reference masters are available for measurement, choosing double mastering is required for calibration. This is mandatary step. Double mastering must be done at least once before doing single mastering.

- **SINGLE**
  When there is only one reference master available, choose single master mode. Single mastering will work only when double mastering is already done at least once for that program

VII. HIGHER MASTER

Enter the actual value of the higher master that was mentioned on the higher master component.

VIII. LOWER MASTER

Enter the actual value of the lower master that was mentioned on the lower master component.

IX. MEASURING DIRECTION

Final results are dependent on these selections

- **ID (Internal Diameter)**
  For measuring internal diameter of component choose this option else results are different. If measurement direction is ID in that case readings goes above higher limit values result will be REJECT, and if readings go below lower limit values result will be REWORK.
  EX-ID=15.20 mm
  If ID is 15.25mm then Reject Condition
  If ID is 15.15mm then Rework Condition

- **OD (Outer Diameter)**
  For measuring outer diameter of component choose this option else results are different. If measurement direction is OD in that case readings goes above higher limit values result will be REWORK and if readings go below lower limit values result will be REJECT.
  EX-OD=20.20 mm

If OD is 20.30mm then Rework Condition
If OD is 20.10mm then Reject Condition

- **Range**
  If the user wants to check and accept components only within a certain range, and all components outside of that range are rejected, then select this option.

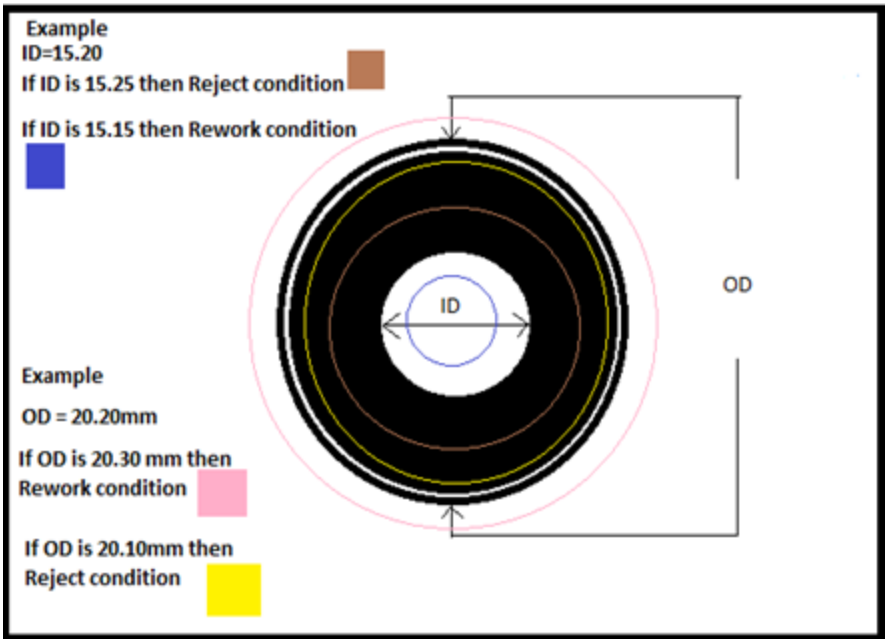


Figure 1

X. MEASUREMENT MODE

- **Current**
  In Current mode actual current moments readings are shown as result.

- **Max**
  In Max mode highest reading of measurement cycle is captured and displayed as result.

- **Min**
  In Min mode lowest reading of measurement cycle is captured and displayed as result.

- **Average**
  In Average mode average of all readings are shown as result.

- **TIR**
  In TIR mode total traverse of readings during measurement cycle are shown as result.

- **MEAN**
  In Mean mode mean of all readings are shown as result.

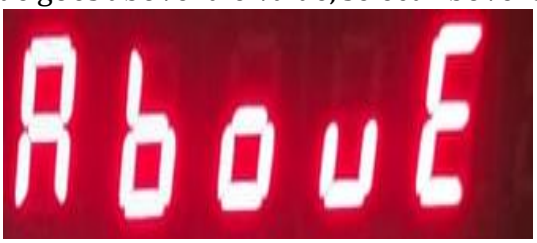
XI. RESULT DISPLAY MODE

- **RELATIVE**
  In this mode nominal value will not be considered for final result display. Direct measurement value is shown on display as final result.

- **ABSOLUTE**
  In this mode nominal value will be added to the obtained measurement value and then final result will be displayed.

XII. SENSE DIRECTION

- **ABOVE**
  Select the auto sense direction Above or Below. If the cycle start trigger is expected when the value goes above idle value, select Above. Otherwise select Below.



- **BELOW**

XIII. SENSE VALUE

When a sense value limit is entered, the cycle will start automatically after the limit is reached.

6. Many peripherals can be connected to a spade Eiffel display unit

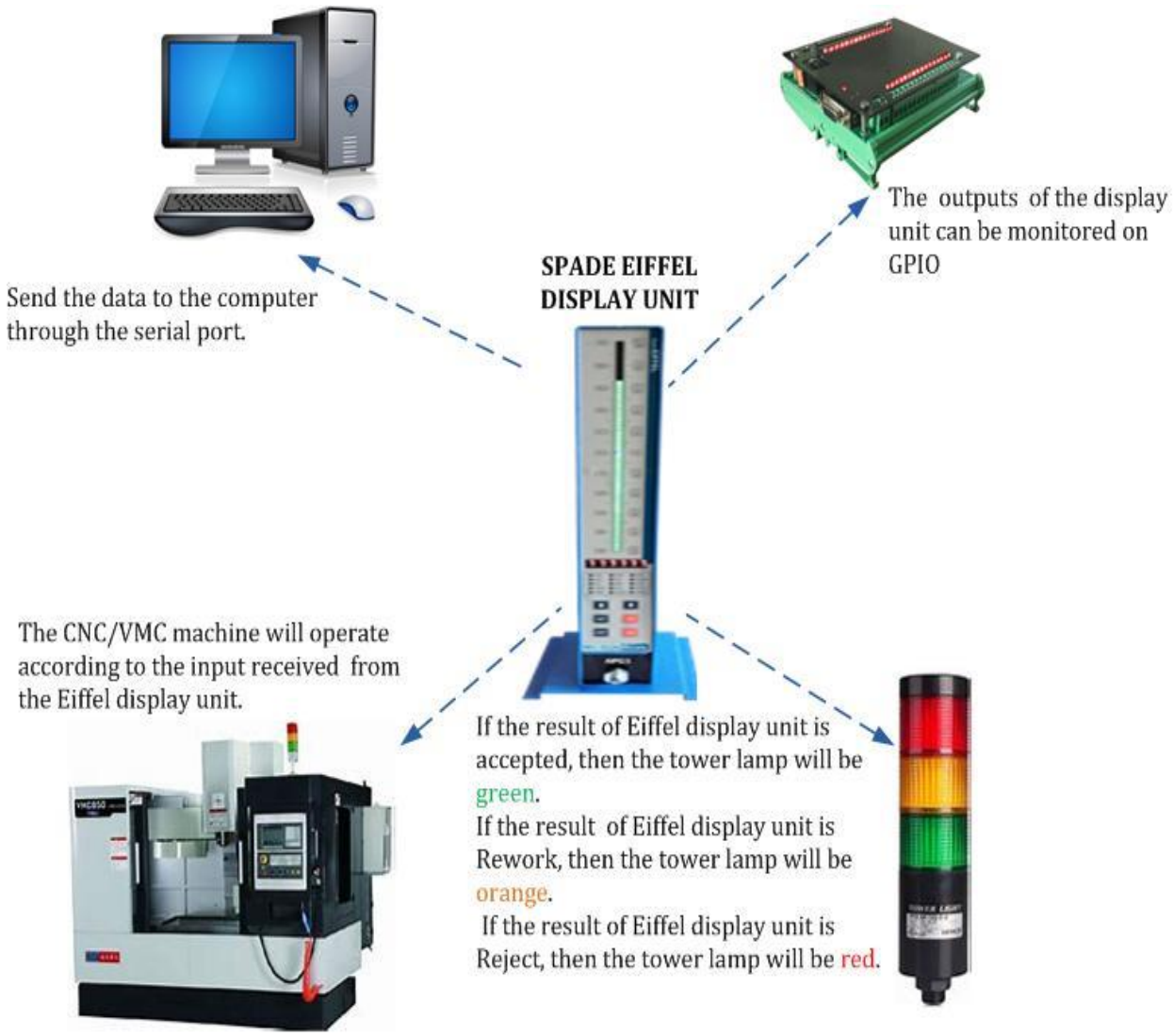


Figure 2

7. How to do mastering

- Double Mastering

  Note: When two reference masters are available for measurement, choosing double mastering is required for calibration. This is mandatary step. Double mastering must be done at least once before doing single mastering

  1. Select double mastering.
  2. Pressing M1, the screen will show the message 'HIGHER MASTER (HI MAS)'.
  3. After placing the plug into the higher master, press the M1 key.
  4. The screen will show the message 'LOWER MASTER (LO MAS)'.
  5. After placing the plug into the lower master, press the M2 key.
  6. The message 'SAVE' will display.

- Single Mastering

  Note: When there is only one reference master available, choose single master mode. Single mastering will work only when double mastering is already done at least once for that program

  1. Select single mastering.
  2. Pressing M1, the screen will show the message 'MASTER'.
  3. After placing the plug into the master, press the M1 key.
  4. The message 'SAVE' will display.

8. Connection Detail

➢ Result status relay connection

9 Pin round Connector	Relay Connection	Relay
1	NC	ACCEPT Relay
2	CMN	
3	NO	
4	NC	REJECT Relay
5	CMN	
6	NO	
7	NC	REWORK Relay
8	CMN	
9	NO	

Table 1

➢ Foot-switch connection

4 Pin round connector	Connection
1	Common
2	Footswitch-1
3	Footswitch-2
4	NC

Table 2

- To operate Foot-switch-1 connect one terminal of switch to common (pin1 of 4pin connector) and another terminal to Foot-switch-1 (pin2 of 4pin mx male connector).
- To operate Foot-switch-2 connect one terminal of switch to common (pin1 of 4pin mx male connector) and another terminal to Foot-switch-2(pin3 of 4pin mx male connector).

➢ Serial Communication Port

Display unit has D sub miniature 9pin female connector for serial interface. Below are pin details for this connector. If the is being connected to computer's serial port, one to one straight three core cable is required.

DB9 Pin	Signal Name
1	NC
2	TXD RS232
3	RXD RS232
4	NC
5	GND
6	FOOT- SWITCH COMMON
7	FOOT- SWITCH-1
8	FOOT- SWITCH-2
9	P1.11

Table 3

- **Table Terminology**

  NC: Do not make any electrical connection to these pins. Some or all of these pins might be used for internal testing and factory settings.

  GND: Supply negative.

  Warning: Wrong connection or over voltage at any of the D type connector pin may permanently damage the device.

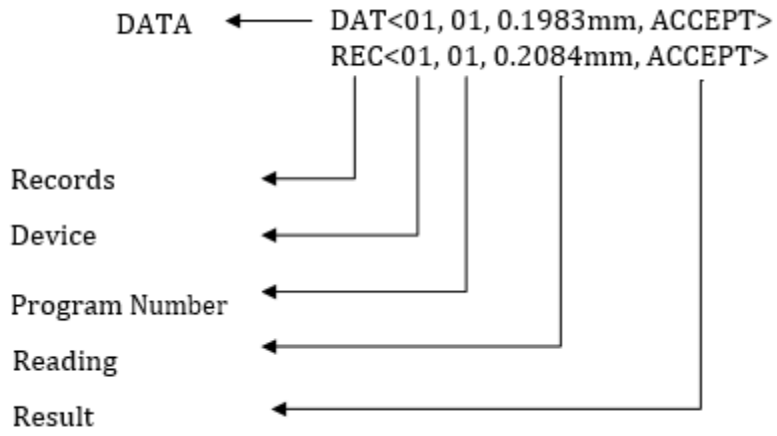
9. Measurement Cycle for Auto Program selection

For Auto program selection mode GPIO device should be properly connected to the display device. If GPIO device is not connected "INPUT EXTENSION NOT RESPONDING" error message shows on display screen.

- To start measurement cycle first check all the plugs are within the proximity of the sensor/rest position.
- Lift any one plug at a time then its respective program will be automatically selected.
- Put lifted plug into its respective component for measurement.
- Measurement status will be displayed on screen as Accept, Reject or Rework.
- Press "ENT" key or press foot switch once for saving the cycle result status into the device and at same time transmitting over serial port.
- Put plug back to its rest position.
- One measurement cycle completed.
- Repeat same procedure for all plugs.

10. Data Transmission Frame Format

A data frame is sent over RS232 port at predefined interval. All the data is in ASCII format and can be viewed on hyper terminal. Default interval setting is 50mSec and default baud rate is 19200. The data frame is always terminated by ASCII code of carriage return. The probe reading data are enclosed in REC delimiter and values within braces are separated by comma.



Warranty statement

All the products are covered under warranty for a period of 12 months against Manufacturing defects, workmanship and malfunction under normal operating conditions. The warranty is subject to the terms and conditions mentioned below.

1. The warranty commences from the date of sale for a period of 12 months irrespective of the actual installation date.
2. The warranty is against manufacturing defects and any subsequent malfunction of the instrument during the normal operation. The warranty shall not be applicable in case of accidental damage, damage due to wrong operation, connection or conditions that are out of normal operating specifications.
3. MICRONBEATS Metrology Solutions, at its discretion may repair or replace the product depending on the condition of instrument, availability of spare parts and type of failure.
4. In case of warranty claim, the warranty period will not be extended and remains same as stated earlier from the date of sale.
5. Maximum liability of MICRONBEATS Metrology Solutions remains up to repair or replacement of the product only. Any damages or losses raised out of use of the instrument are not covered by this warranty. In any case, cost of the product will not be refunded.
6. In case of warranty claim, the product should be sent over to MICRONBEATS Metrology Solutions immediately after noticing the defect or failure. A detailed note of operating conditions in which fault occurred will be helpful in rectifying the defect.
7. Do not try to open or repair the instrument on your own. Warranty will stand null and void in such case. Products with tampered warranty seal will not be considered for warranty claims and regular service charges will be applicable.
8. In all claims, the company's decision will be final and legally binding.
9. Any and all disputes are subject to pune jurisdiction only.

Micronbeats Metrology Solutions
#226, Laxmi colony, Lane No.5,
Behind Manish
market, Hadapsar, Pune – 411028.
www.Micronbeats.com
Email: sales@micronbeats.com