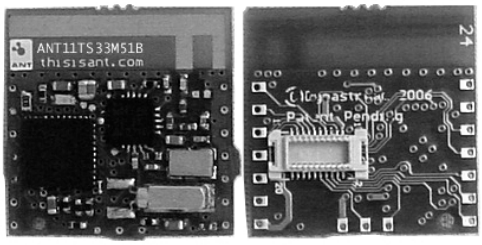
AT3 RF Transceiver Module

FEATURES

- 2.4GHz worldwide ISM band
- 20mm x 20mm drop-in module
- SensRcore™ development platform
- Ultra low power operation
- Simple sync/async serial interface
- Integrated F antenna
- Broadcast, acknowledged, or burst data transmissions
- ANT channel combined message rate up to 180Hz (8byte data payload)
- Minimum message rate per ANT channel 0.5Hz
- Burst transfer rate up to 20Kbps (true data throughput)
- 1 Mbps RF data rate
- Up to 1/4/8 ANT channels
- 125 selectable RF channels
- Up to 3 public, managed and/or private networks
- 2.0V to 3.6V supply voltage range
- -40°C to +85°C operating temperature
- FCC test ready
- RoHS compliant



FAMILY MEMBERS

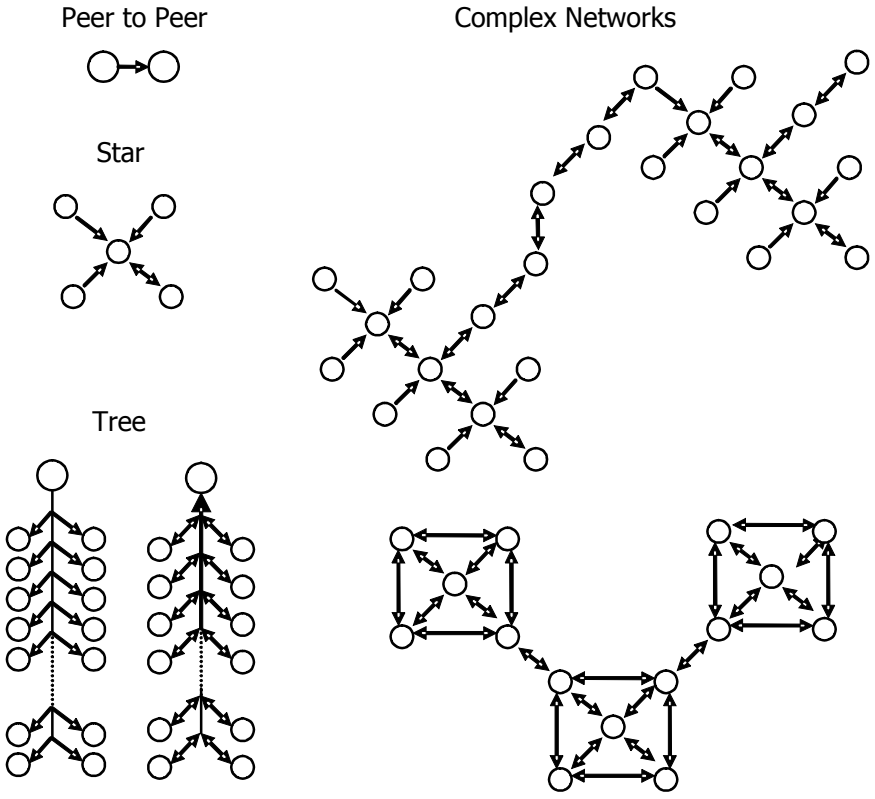
ANT11TS33M4IB / ANT11TS33M5IB
8 ANT channels, SensRcore™

ANT11TS53M4IB
4 ANT channels, SensRcore™

ANT11TS63M4IB
1 ANT channel, SensRcore™

ANT11TR13M4IB
8 ANT channels

ANT NETWORK CONFIGURATIONS



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Notices and Restricted Use Information

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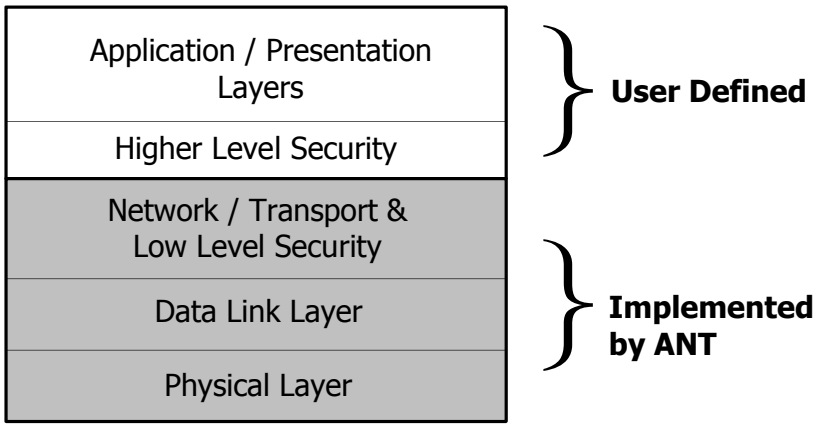
ANT™ Overview

ANT™ is a practical wireless sensor network protocol running on 2.4 GHz ISM band. Designed for ultra low power, ease of use, efficiency and scalability, ANT easily handles peer-to-peer, star, tree and practical mesh topologies. ANT provides reliable data communications, flexible and adaptive network operation and cross-talk immunity. ANT's protocol stack is extremely compact, requiring minimal microcontroller resources and considerably reducing system costs.

ANT provides carefree handling of the Physical, Network, and Transport OSI layers. In addition, it incorporates key low-level security features that form the foundation for user-defined, sophisticated, network-security implementations. ANT ensures adequate user control while considerably lightening computational burden in providing a simple yet effective wireless networking solution.



ANT supports public, managed and private network architectures with 2^{32} uniquely addressable devices possible, ensuring that each device can be uniquely identified from each other in the same network.

ANT is proven with an installed base of over two million nodes in ultra low power sensor network applications in sport, fitness, home and industrial automation. The ANT solutions are available in chips, chipsets and modules to suit a wide variety of application needs.

A complete description of the ANT message protocol is found in the ANT Message Protocol and Usage document. The serial interface details are provided in the Interfacing with ANT General Purpose Chipsets and Modules document.

1 AT3 Modules

The AT3 drop-in modules are intentionally engineered for ease of use, scalability and lowest power consumption. AT3 modules are based on the chipset combining MSP430f22x2/4, the ultra low power microcontroller (MCU) from Texas Instrument, and nRF24L01, the ultra low power radio chip from Nordic Semiconductor. Integrated with an F antenna, AT3 modules reduce the need for RF design expertise. SensRcore™, an easy-to-use design platform to build wireless sensors, is equipped in most of AT3 modules.

AT3 family of modules provides a comprehensive solution to the requirements of building a wireless sensor network consisting of nodes from simple sensors to complex hubs or control nodes. A common pin-out and 20 x 20mm footprint enables easy network development, upgrade, migration and maintenance.

Four standard AT3 modules are delivered on one common hardware platform:

Module	Description
ANT11TS33M4IB	8 ANT channels, SensRcore with 8 data channels, surface mountable, industrial temperature range
ANT11TS33M5IB	8 ANT channels, SensRcore with 8 data channels, Molex connector, industrial temperature range
ANT11TR13M4IB	8 ANT channels, surface mountable, industrial temperature range
ANT11TS53M4IB	4 ANT channels, SensRcore with 6 data channels, surface mountable, industrial temperature range
ANT11TS63M4IB	1 ANT channel, SensRcore with 4 data channels, surface mountable, industrial temperature range

The AT3 module has been pre-tested by a FCC registered lab to comply with the requirements for FCC CFR47 and other applicable standards for Intentional Radiators.

1.1 SensRcore™ Platform

SensRcore is a wireless sensor development platform that is equipped with most AT3 modules. When using sensRcore to develop a wireless sensor, both analog and digital sensors can be directly connected to the ANT MCU. The normally required firmware development is replaced by writing a simple SensRcore script. An application host MCU could be eliminated from the system design. The result is a reduced component cost, size, power and the shortened development cycle of the target sensor device.

When AT3 modules are operated in sensRcore mode, the channel configuration parameters are stored in non-volatile memory and are enabled upon power-up. When I/O pins are configured as digital inputs or outputs, the electrical requirements are the same as all other signaling pins. When I/O pins are configured as analog inputs, different signal ranges can be selected with different reference voltages. The reference voltages available are V_{CC}, 2.5V, and 1.5V. Signals that exceed the specified reference level will be read by the A/D as a maximum value. Signal levels should not exceed V_{CC}. Each AIOx pin can be used as an analog input or a digital I/O pin; each IOx pin can be used only as a digital I/O pin. I/O pins that are not being used in a specific SensRcore mode configuration should be left configured as digital inputs, which is the default setting.

ANT sensRcore scripts consist of ANT messages and commands. Please refer to "ANT Message Protocol and Usage" and "SensRcore Messaging and Usage". The script can be generated by using the software tool *SensRware*. There are 200 bytes available in the non volatile memory for SensRcore script.

1.2 Pin Assignment

The ANT11Txx3MxIB module contains a dual-chip ANT implementation. The ANT MCU contains the ANT protocol stack along with the ANT serial interface. The radio chip is Nordic Semiconductor's nRF24L01. The module may be connected to the user's host controller using the 17 pin-out assignment (surface mount) style or the 20-pin Molex header connection style provided below:

Surface Mount Pin	Molex Header Pin	Pin Name	Async Mode	Sync Mode	SensRcore Mode	Description
1	6	TIE_GND1	GND	GND	GND	Not used, must be tied to ground
2	10	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	Active low reset pin
3	1	V_{CC}	V_{CC}	V_{CC}	V_{CC}	Power supply source
4	19	TIE_GND2	GND	GND	GND	Power supply ground
5	8	IO5	Tie to GND	Tie to GND	IO5	SensRcore mode -> digital input/output
6	17	$\overline{\text{SUSPEND}}$ / $\overline{\text{SRDY}}$ /AIO0	$\overline{\text{SUSPEND}}$	$\overline{\text{SRDY}}$	AIO0	ASync -> Suspend control Sync -> Serial port ready SensRcore -> Analog/Digital input / output
7	15	SLEEP/ $\overline{\text{MRDY}}$ /AIO1	SLEEP	$\overline{\text{MRDY}}$	AIO1	Async -> Sleep mode enable Sync -> Message ready indication SensRcore -> Analog/Digital input / output
8	13	IO7	Tie to GND	Tie to GND	IO7	SensRcore -> Digital input / output
9	11	PORTSEL	PORTSEL (Tie to GND)	PORTSEL (Tie to V_{CC})	Tie to V_{CC} for custom Tie to GND for demo	Asynchronous or synchronous port select SensRcore -> Demo script or user scripts
10	7	BR2/SCLK/ DevSel2	BR2	SCLK	DevSel2	Async -> Baud rate selection Sync -> Clock output signal SensRcore -> Configuration selection
11	4	TXD0/SOUT/ IO6	TXD0	SOUT	IO6	Async -> Transmit data signal Sync -> Data output SensRcore -> Digital input / output
12	3	RXD0/SIN/AIO2	RXD0	SIN	AIO2	Async -> Receive data signal Sync -> Data input SensRcore -> Analog/Digital input / output
13	5	BR1/SFLOW/ DevSel1	BR1	SFLOW	DevSel1	Async -> Baud rate selection Sync -> Bit or byte flow control select SensRcore -> Configuration selection
14	9	BR3/DevSel3	BR3	Tie to GND	DevSel3	Async -> Baud rate selection Sync -> Tie low SensRcore -> Configuration selection
15	14	AIO3	Tie to GND	Tie to GND	AIO3	SensRcore -> Analog/Digital input / output
16	12	AIO4	Tie to GND	Tie to GND	AIO4	SensRcore -> Analog/Digital input / output
17	2	RTS/SEN/IOSEL	RTS	SEN	IOSEL (Tie to GND)	Async -> Request to send Sync -> Serial enable signal SensRcore -> IOSEL tie low
	16, 18, 20	NC	NC	NC	NC	No connection

1.3 Asynchronous Baud Rate

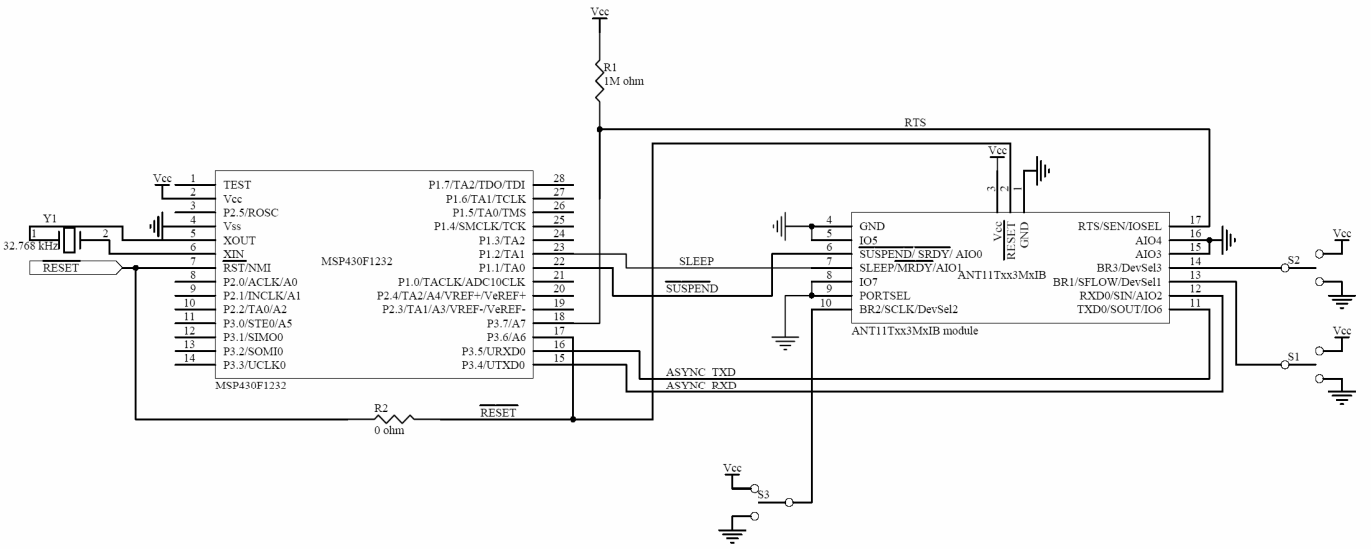
The baud rate of the asynchronous communication is controlled by the speed select signals BR1, BR2 and BR3. The table below shows the relationship between the states of the speed select signals and the corresponding baud rates.

BR3	BR2	BR1	Baud Rate
0	0	0	4800
0	1	0	19200
0	0	1	38400
0	1	1	50000
1	0	0	1200
1	1	0	2400
1	0	1	9600
1	1	1	57600

2 Sample Designs

Samples 3.1, 3.2, and 3.3 show the proper electrical connectivity of an ANT11TxxxMxIB module to an application's host microcontroller. The three reference designs use the 17 pin-out assignment connection style.

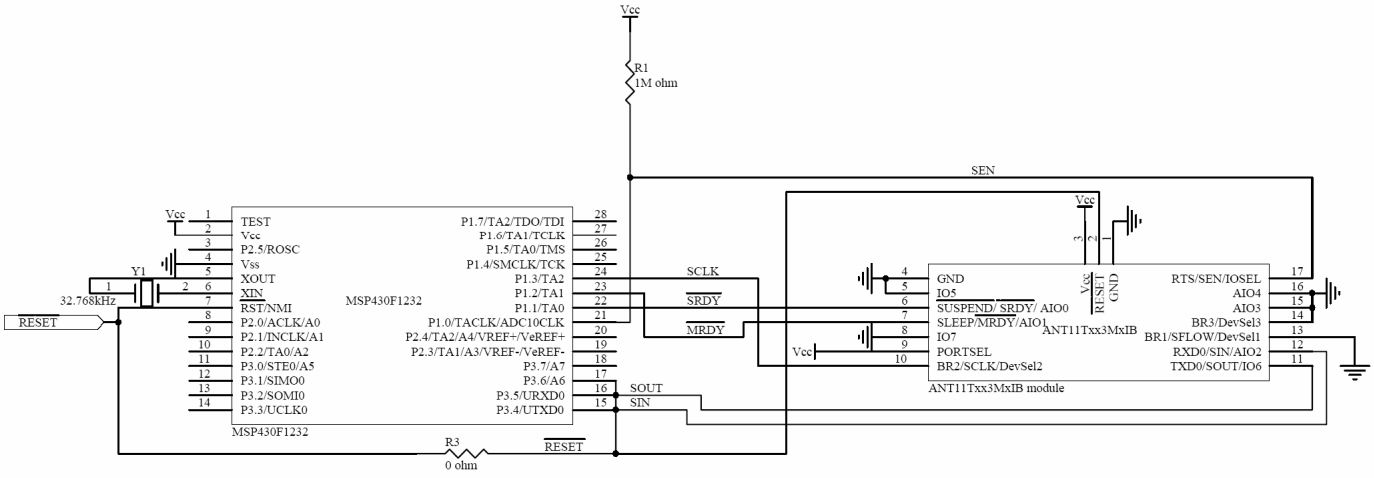
2.1 **Async Mode**



Notes:

- Module RXD and TXD connected directly to hardware USART of microcontroller.
- The illustrated switches on the baud rate selection pins (BR1, BR2, and BR3) are for ease of use only. The Baud rate selection pins may be connected directly to the logic level of interest.
- R2 allows optional control of the module $\overline{\text{RESET}}$ signal by a microcontroller I/O pin.

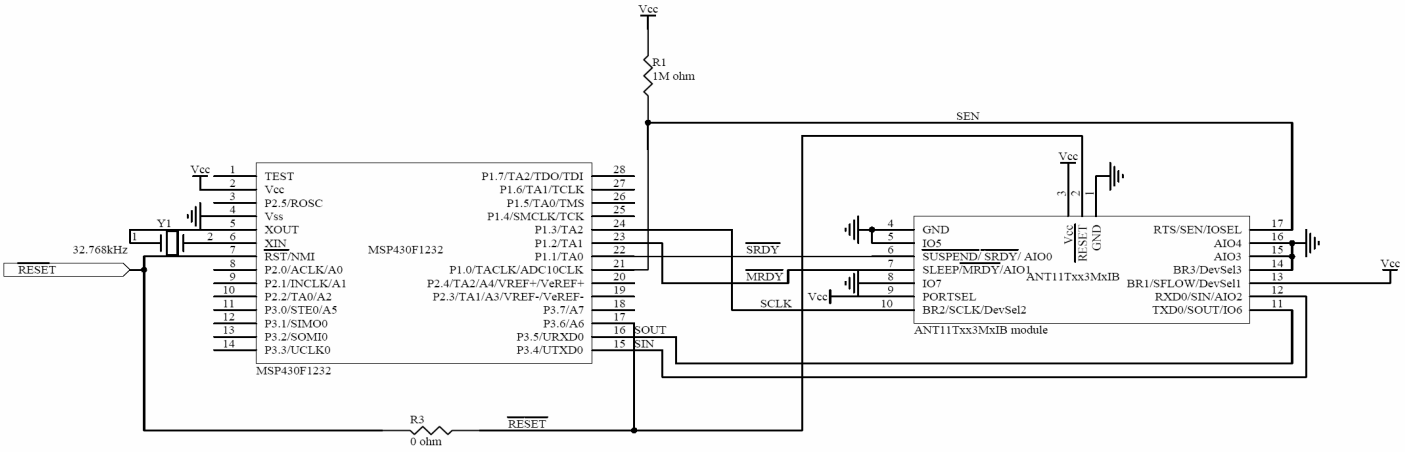
2.2 **Byte Sync Mode**



Notes:

- Module SOUT and SIN connected directly to hardware USART of microcontroller.
- SCLK and SEN need to be on interrupt-capable I/O pins on the microcontroller.
- R3 allows optional control of the module $\overline{\text{RESET}}$ signal by a microcontroller I/O pin.

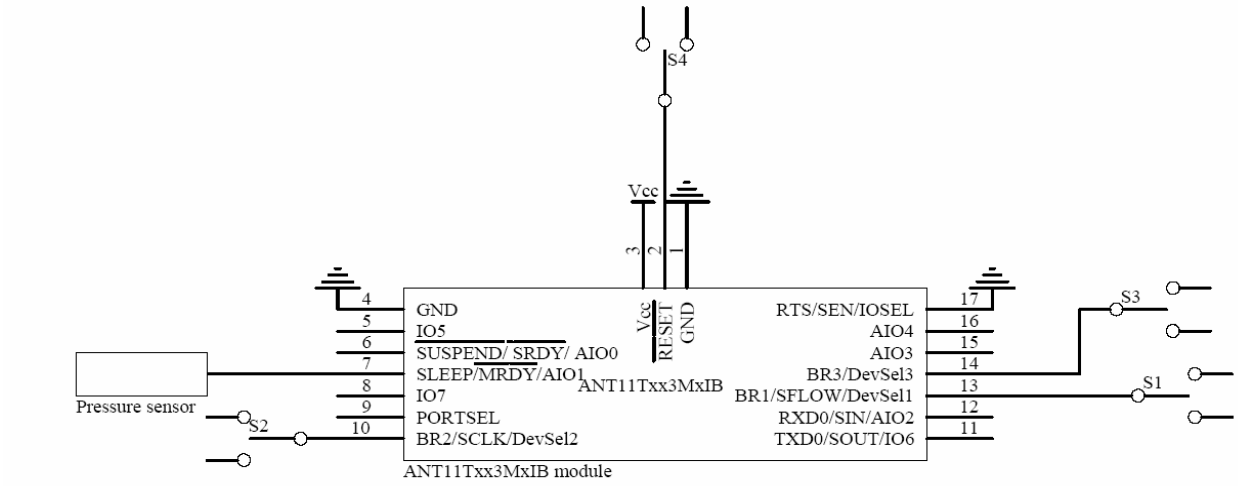
2.3 Bit Sync Mode



Notes:

- All interface signals are connected directly to I/O pins on the microcontroller.
- SCLK and SEN need to be on interrupt-capable I/O pins on the microcontroller.
- R3 allows optional control of the module $\overline{\text{RESET}}$ signal by a microcontroller I/O pin.

2.4 SensRcore™ Mode (pressure sensor configuration)



3 Electrical Specifications

Absolute Maximum Ratings	
Voltage applied at V_{CC} to V_{SS}	-0.3V to +3.6V
Input voltage at any pin	-0.3V to V_{CC} +0.3V
Diode current at any pin	±2mA
Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +85°C

Note: Stress exceeding one or more of the absolute maximum ratings may cause permanent damage to the chipsets.

Conditions: V_{CC} = +2.0V, V_{SS} = 0V, T_A = - 40°C to +85°C

Symbol	Parameter (condition)	Notes	Min	Typ	Max	Units
	Operating conditions					
V_{CC}	Supply voltage		2.0	3.0	3.6	V
TEMP	Operating temperature		-40	25	+85	ºC
	Digital input pin					
V_{IH}	HIGH level input voltage		1.9		V_{CC}	V
V_{IL}	LOW level input voltage		V_{SS}			V
	Digital output pin					
V_{OH}	HIGH level output voltage (I_{OH}=-0.5mA)		V_{CC} - 0.25		V_{CC}	V
V_{OL}	LOW level output voltage (I_{OL}=0.5mA)		V_{SS}		0.25	V
	Analog input pin					
V_{Analog}	Input voltage range	4)	V_{SS}		V_{CC}	V
F_{Sample}	Sample rate	5)	0.002		500	Sample/s
	Counter input pin					
$F_{Counter}$	Input frequency				1000	Hz
	Synchronous serial timing					
SCLK freq.	Synchronous clock frequency (byte mode)		285	300	315	kHz
$t_{ReadValid}$	Data is valid on read before low-to-high transition on the clock (byte mode)		0.5			µs
$t_{WriteValid}$	Data must be valid on write within this time after a high-to-low transition on the clock (byte mode)				2	µs
t_{SRDY_MinLow}	Minimum $\overline{SRDY}$ low time		2.5			µs
t_{Reset}	Synchronous reset. $\overline{SRDY}$ falling edge to $\overline{MRDY}$ falling edge		250			µs
	General RF conditions					
f_{OP}	Operating frequency	1)	2400		2524	MHz
$F_{Channel}$	Channel spacing			1		MHz
Δf	Frequency deviation			±156		kHz
	Current consumption					
I_{Idle}	No active channels – no communications			1.1		µA
$I_{Suspend}$	Asynchronous suspend activated			1.1		µA
I_{Base}	Base active current			2.6		µA
I_{sample}	Average current/analog sample			0.5		µA
I_{SC_RF}	Average current/ ANT message in sensRcore mode			13		µA
$I_{Msg\_Rx\_ByteSync}$	Average current / Rx message in byte sync mode			10.5		µA
$I_{Msg\_Rx\_BitSync}$	Average current / Rx message in bit sync mode			13.1		µA

Symbol	Parameter (condition)	Notes	Min	Typ	Max	Units
$I_{Msg\_Rx\_57600}$	Average current / Rx message in async mode at 57600 baud			9.1		µA
$I_{Msg\_Rx\_19200}$	Average current / Rx message in async mode at 19200 baud			10.4		µA
$I_{Msg\_Rx\_4800}$	Average RF current / Rx message in async mode at 4800 baud			8.5		µA
$I_{Msg\_Tx\_ByteSync}$	Average current / Tx-only message in byte sync mode			6.4		µA
$I_{Msg\_Tx\_BitSync}$	Average current / Tx-only message in bit sync mode			10.8		µA
$I_{Msg\_Tx\_57600}$	Average current / Tx-only message in async mode at 57600 baud			5.7		µA
$I_{Msg\_Tx\_19200}$	Average current / Tx-only message in async mode at 19200 baud			7.5		µA
$I_{Msg\_Tx\_4800}$	Average current / Tx-only message in async mode at 4800 baud			4.4		µA
$I_{Msg\_TR\_ByteSync}$	Average current / Tx message in byte sync mode			14.1		µA
$I_{Msg\_TR\_BitSync}$	Average current / Tx message in bit sync mode			18.4		µA
$I_{Msg\_TR\_57600}$	Average current / Tx message in async mode at 57600 baud			13.5		µA
$I_{Msg\_TR\_19200}$	Average current / Tx message in async mode at 19200 baud			15.0		µA
$I_{Msg\_TR\_4800}$	Average current / Tx message in async mode at 4800 baud			11.7		µA
$I_{Msg\_Ack\_ByteSync}$	Average current / Acknowledged message in byte sync mode			19.6		µA
$I_{Msg\_Ack\_BitSync}$	Average current / Acknowledged message in bit sync mode			23.4		µA
$I_{Msg\_Ack\_57600}$	Average current / Acknowledged message in async mode at 57600 baud			18.7		µA
$I_{Msg\_Ack\_19200}$	Average current / Acknowledged message in async mode at 19200 baud			19.9		µA
$I_{Msg\_Ack\_4800}$	Average current / Acknowledged message in async mode at 4800 baud			17.2		µA
I_{Peak}	Peak Current consumption			19		mA
I_{PeakTx}	Peak Current – Tx-only @ 0dBm			13		mA
I_{Ave}	Broadcast Tx-only @ 0.5Hz in byte sync mode			5.8		µA
I_{Ave}	Broadcast Tx-only @ 2Hz in byte sync mode			15.4		µA
I_{Ave}	Broadcast Rx @ 0.5Hz in byte sync mode			7.8		µA
I_{Ave}	Acknowledged @ 0.5Hz in byte sync mode			12.4		µA
I_{Ave}	Burst continuous @ 14Kbps in byte sync mode			2.24		mA
I_{Ave}	Burst continuous @ 20Kbps in byte sync mode			3.21		mA
I_{Ave}	Burst continuous @ 10Kbps in bit sync mode			3.22		mA
I_{Ave}	Burst continuous @ 14Kbps in async mode at 57600 baud			2.37		mA
I_{Ave}	Burst continuous @ 20Kbps in async mode at 57600 baud			3.31		mA
	Transmitter operation					
P_{RF}	Maximum output power	2)		0	4	dBm
ΔP	Output power variation	3)			±4	dBm
P_{BW}	20dB bandwidth for modulated carrier				1000	kHz
P_{RF2}	2nd adjacent channel transmit power 2MHz				-20	dBm
P_{RF3}	3rd adjacent channel transmit power 3MHz				-40	dBm
I_{VCC}	Supply peak current @ 0dBm output power			11.3		mA
I_{VCC}	Supply peak current @ -20dBm output power			7		mA
	Receiver operation					

Symbol	Parameter (condition)	Notes	Min	Typ	Max	Units
I_{VCC}	Supply peak current receive mode			12		mA
RX_{SENS}	Sensitivity at 0.1%BER (@1000kbps)			-85		dBm
C/I_{CO}	C/I co-channel			9		dB
C/I_{1ST}	1^{st} adjacent channel selectivity C/I 1MHz			8		dB
C/I_{2ND}	2^{nd} adjacent channel selectivity C/I 2MHz			-22		dB
C/I_{3RD}	3^{rd} adjacent channel selectivity C/I 3MHz			-30		dB

1) Usable band is determined by local regulations.
2) Maximum output power with 0dBm output power setting.
3) Variation from 2402MHz to 2479MHz.
4) Voltages exceeding the reference can be used but provide no information.
5) Max refers to total number of samples available to be distributed over the number of A/D sources currently active.

3.1 Current Calculation Examples

1.Master channel with Broadcast data at 4Hz with a bit synchronous serial interface.

$$I_{ave} = (I_{Msg\_Tx\_BitSync} * Message\_Rate) + I_{Base}$$

$$= (18.4\ \mu A/message * 4\ messages) + 2.6\mu A$$

$$= 76.2\ \mu A$$

2.Receive channel with Acknowledged data at 2Hz with an asynchronous serial interface at 57 600 baud.

$$I_{ave} = (I_{Msg\_Ack\_57600} * Message\_Rate) + I_{Base}$$

$$= (18.7\mu A/message * 2\ messages) + 2.6\mu A$$

$$= 40.0\mu A$$

3.Transmit channel with Acknowledged data at 2Hz with an asynchronous serial interface at 57 600 baud.

$$I_{ave} = (I_{Msg\_Ack\_57600} * Message\_Rate) + I_{Base}$$

$$= (18.7\ \mu A/message * 2\ messages) + 2.6\mu A$$

$$= 40.0\mu A$$

4.SensRcore device using an ANT message rate of 4Hz and sampling an A/D input at 16 Hz.

$$I_{ave} = (I_{SC\_RF} * Message\_Rate) + (I_{Sample} * Sample\_Rate) + I_{Base}$$

$$= (13\mu A/message * 4\ messages) + (0.5\mu A/sample * 16\ samples) + 2.6\mu A$$

$$= 62.6\mu A$$

3.2 A/D Specifications

These are taken from the TI MSP430x22x4 datasheet:

10-bit ADC, power supply and input range conditions (see Note 1)

PARAMETER		TEST CONDITIONS	T_A	VCC	MIN	TYP	MAX	UNIT
V_{CC}	Analog supply voltage range	V_{SS} = 0 V			2.2		3.6	V
V_{Ax}	Analog input voltage range (see Note 2)	All Ax terminals. Analog inputs selected in ADC10AE register.			0		V_{CC}	V
I_{ADC10}	ADC10 supply current (see Note 3)	$f_{ADC10CLK}$ = 5.0 MHz ADC10ON = 1, REFON = 0 ADC10SHT0 = 1, ADC10SHT1 = 0, ADC10DIV = 0	I: -40~85°C T: -40~105°C	2.2 V		0.52	1.05	mA
				3 V		0.6	1.2	mA

NOTES:
1. The leakage current is defined in the leakage current table with Px.x/Ax parameter.
2. The analog input voltage range must be within the selected reference voltage range V_{R+} to V_{R-} for valid conversion results.
3. The internal reference supply current is not included in current consumption parameter I_{ADC10}.
4. The internal reference current is supplied via terminal V_{CC}. Consumption is independent of the ADC10ON control bit, unless a conversion is active. The REFON bit enables the built-in reference to settle before starting an A/D conversion.

10-bit ADC, built-in voltage reference

PARAMETER		TEST CONDITIONS	VCC	MIN	TYP	MAX	UNIT
$V_{CC,REF+}$	Positive built-in reference analog supply voltage range	$I_{VREF+} \le$ 1mA, REF2_5V=0		2.2			V
		$I_{VREF+} \le$ 0.5mA, REF2_5V=1		2.8			V
		$I_{VREF+} \le$ 1mA, REF2_5V=1		2.9			V
V_{REF+}	Positive built-in reference voltage	$I_{VREF+} \le I_{VREF+}$max, REF2_5V=0	2.2 V/3 V	1.41	1.5	1.59	V
		$I_{VREF+} \le I_{VREF+}$max, REF2_5V=1	3 V	2.35	2.5	2.65	V

10-bit ADC, linearity parameters

PARAMETER		TEST CONDITIONS	VCC	MIN	TYP	MAX	UNIT
E_I	Integral linearity error		2.2 V/3 V			±1	LSB
E_D	Differential linearity error		2.2 V/3 V			±1	LSB
E_O	Offset error	Source impedance R_S < 100 Ω,	2.2 V/3 V			±1	LSB
E_G	Gain error	SREFx = 010; un-buffered external reference; V_{eREF+} = 1.5V	2.2 V		±1.1	±2	LSB
		SREFx = 010; un-buffered external reference; V_{eREF+} = 2.5V	3 V		±1.1	±2	LSB
		SREFx = 011; buffered external reference (see Note 1); V_{eREF+} = 1.5V	2.2 V		±1.1	±4	LSB
		SREFx = 011; buffered external reference (see Note 1); V_{eREF+} = 2.5V	3 V		±1.1	±3	LSB
E_T	Total unadjusted error	SREFx = 010; un-buffered external reference; V_{eREF+} = 1.5V	2.2 V		±2	±5	LSB
		SREFx = 010; un-buffered external reference; V_{eREF+} = 2.5V	3 V		±2	±5	LSB
		SREFx = 011; buffered external reference (see Note 1); V_{eREF+} = 1.5V	2.2 V		±2	±7	LSB
		SREFx = 011; buffered external reference (see Note 1); V_{eREF+} = 2.5V	3 V		±2	±6	LSB

NOTES: 1. The reference buffer's offset adds to the gain and total unadjusted error.

3.3 Reflow Guideline

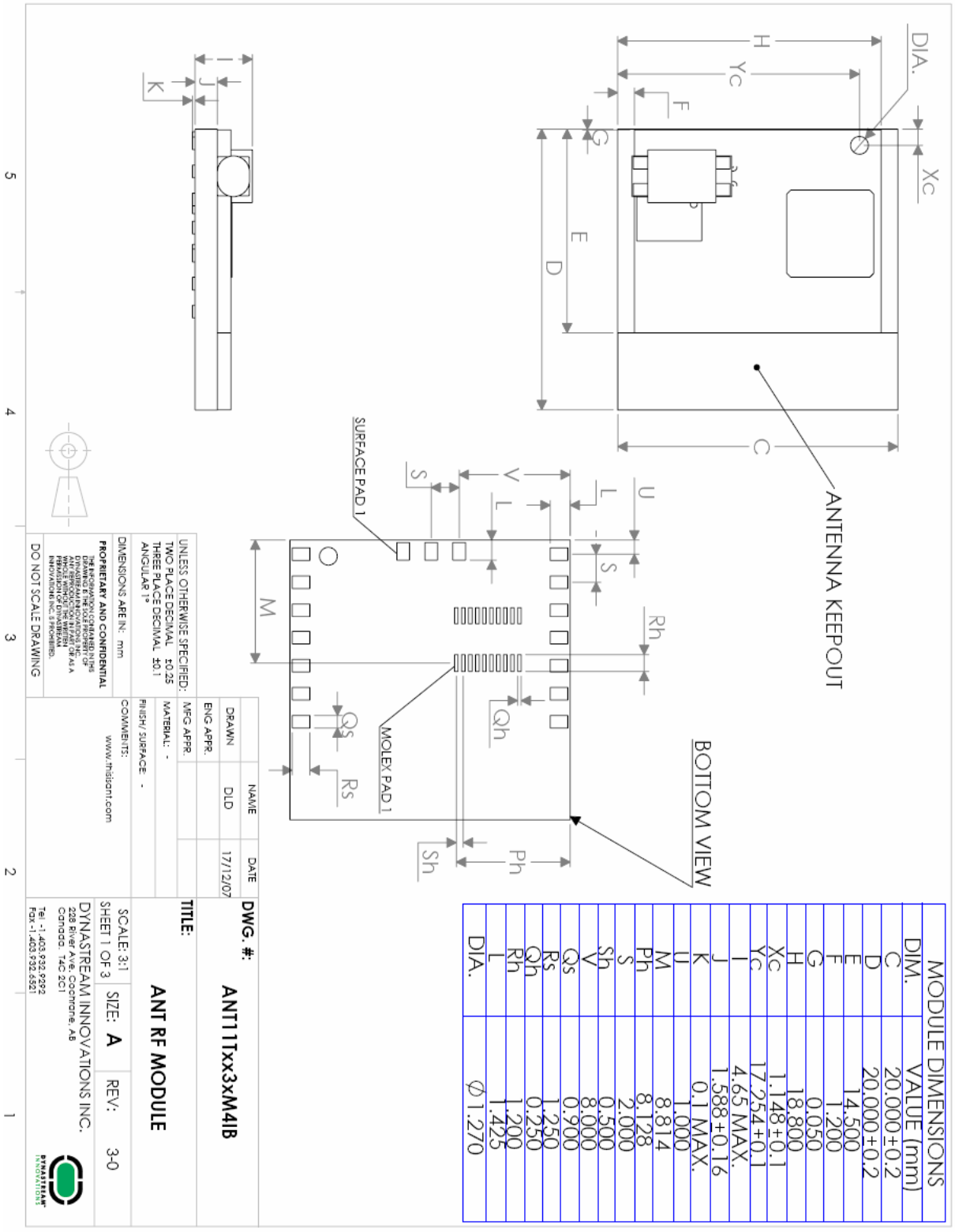
Follow the guideline below if ANT11TxxM4IB modules go through reflow oven.

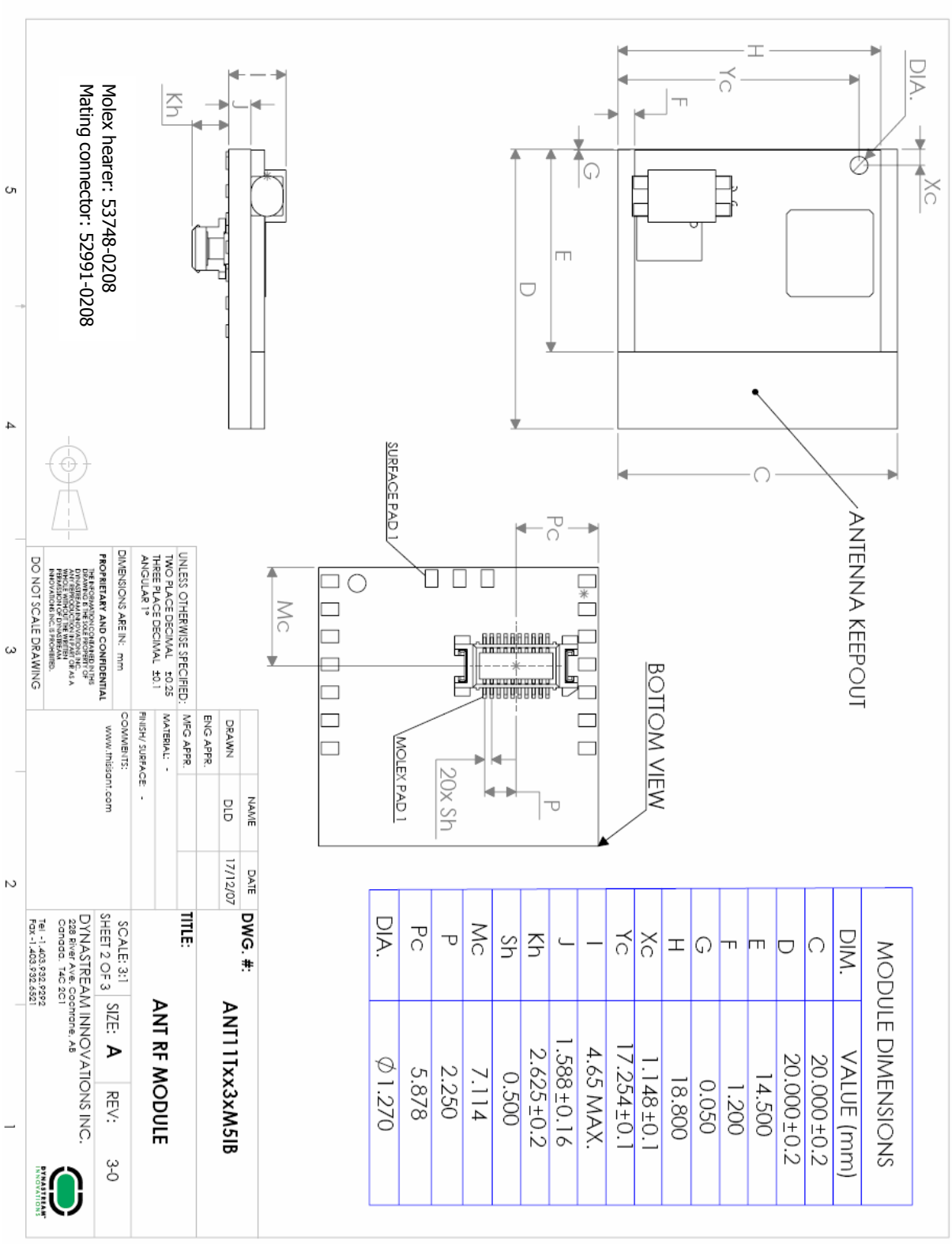
Peak solder joint/pad temperatures exceeding 240ºC are not recommended.

If possible, pre-heat the assembly within the oven profile for ~30 seconds at ~150 ºC.

Follow the solder paste manufacturer's recommendations, especially regarding temperature ramp rate and the time above liquidus.

4 Mechanical Drawings




DIA.
Xc
H
Yc
F
G
E
D
C
ANTENNA KEEPOUT
BOTTOM VIEW
SURFACE PAD 1
MOLEX PAD 1
Pc
Mc
P
20x Sh
Kh
J
I
Molex hearer: 53748-0208
Mating connector: 52991-0208
MODULE DIMENSIONS
DIM. VALUE (mm)
C 20.000±0.2
D 20.000±0.2
E 14.500
F 1.200
G 0.050
H 18.800
Xc 1.148±0.1
Yc 17.254±0.1
I 4.65 MAX.
J 1.588±0.16
Kh 2.625±0.2
Sh 0.500
Mc 7.114
P 2.250
Pc 5.878
DIA. Ø 1.270
UNLESS OTHERWISE SPECIFIED:
TWO PLACE DECIMAL ±0.25
THREE PLACE DECIMAL ±0.1
ANGULAR 1°
MATERIAL: -
FINISH/ SURFACE: -
DIMENSIONS ARE IN: mm
COMMENTS:
www.thisisant.com
DO NOT SCALE DRAWING
NAME DATE
DRAWN DLD 17/12/07
ENG APPR.
MFG APPR.
DWG. #: ANT11Txx3xM5IB
TITLE: ANT RF MODULE
SCALE: 3:1 SHEET 2 OF 3
SIZE: A
REV: 3-0
DYNASTREAM INNOVATIONS INC.
228 River Ave. Cochrane, AB
Canada T4C 2C1
Tel: +1.403.932.9292
Fax: +1.403.932.6521

SURFACE MOUNT FOOTPRINT
RECOMMENDATION (TOP VIEW)
RFg
PAD 1
RFx
COMPONENT
OUTLINE
COPPER KEEPOUT:
NO COMPONENTS OR
GROUND PLANES IN THIS
AREA
MODULE DIMENSIONS
DIM. VALUE (mm)
Q 0.950
R 2.500
S 2.000
T 1.070
U 1.000
V 8.000
W 21.070
RFx 5.500
RFg 40.000
NOTE:BLANKET KEEP OUTS TO
PROTECT COMPONENTS
DETAIL C
SCALE 2 : 1
UNLESS OTHERWISE SPECIFIED:
TWO PLACE DECIMAL ±0.25
THREE PLACE DECIMAL ±0.1
ANGULAR 1°
DIMENSIONS ARE IN: mm
PROPRIETARY AND CONFIDENTIAL
DO NOT SCALE DRAWING
DRAWN DLD 17/12/07
ENG APPR.
MFG APPR.
MATERIAL: -
FINISH/ SURFACE -
COMMENTS:
www.thisisant.com
DWG. #: ANT11Txx3M4 FOOTPRINT
TITLE: ANT RF MODULE FOOTPRINT
SCALE: 3:1 SHEET 3 OF 3 SIZE: A REV: 3-0
DYNASTREAM INNOVATIONS INC.
228 River Ave. Cochrane, AB
Canada T4C 2C1
Tel: +1.403.932.9292
Fax: +1.403.932.6521

4.1 Connection Diagram