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# TRAINING MANUAL

# ECLIPSE SERIES SPECIFICATIONS SUMMARY

	Frequency	Receiver	Exciter	Power Amplifier	Channel Spacing
<b>Eclipse 50 Series</b>	25-32 MHz	R50	T50	PA50A	Software selectable  <i>Note: Eclipse 50 Series requires 28V supply</i>
	30-40 MHz	R50	T50	PA50B	
	38-50 MHz	R50	T50	PA50C	
<b>Eclipse 70 Series</b>	66-88 MHz	R71A	T70A	PA70	12.5,15,20,25,30 kHz in 5 or 6.25 kHz steps
<b>Eclipse 150 Series</b>	136-156 MHz	R150A	T150A	PA150A	12.5,15,20,25,30 kHz in 5 or 6.25 kHz steps
	148-174 MHz	R150B	T150B	PA150B	
<b>Eclipse 220 Series</b>	215-240 MHz	R220A	T220A	PA220A	6.25, 7.5, 12.5, 25 in 6.25 or 7.5 kHz steps
<b>Eclipse 350 Series</b>	300-330 MHz	R350D	T350D	PA350D	12.5,20,25,30 kHz in 10 or 12.5 kHz steps
	330-360 MHz	R350C	T350C	PA350C	
	360-380 MHz	R350A	T350A	PA350A	
	375-400 MHz	R350B	T350B	PA350B	
<b>Eclipse 500 Series</b>	400-430 MHz	R500A	T500A	PA500A	12.5, 25 kHz in 5, 10, 6.25 or 12.5 kHz steps
	425-453 MHz	R500D	T500D	PA500A / PA501A	
	450-490 MHz	R500B	T500B	PA500B / PA501B	
	485-520 MHz	R500C	T500B	PA500B / PA501B	
<b>Eclipse 800 Series</b>	800-830 MHz	R800A	T800A	n/a	12.5, 25 kHz in 6.25, 10 or 12.5 kHz steps
	850-870 MHz	R800B	T800B	n/a	
	896-930 MHz	R800C	n/a	n/a	
	928-941 MHz	n/a	T800C	n/a	

<b>General</b>	<b>Receiver</b>	<b>Exciter</b>	<b>Power Amp</b>	<b>With Fan</b>	<b>PA 501</b>	<b>SMPS-12</b>	<b>PS-PS</b>
<b>Weight</b>	1.45 Kg	1.8 Kg	3.55 Kg	4.85 Kg	4.65 Kg	2.6 Kg	8.0 Kg
<b>Dimension</b>	2UW	2UW	3UW	4UW	5UW	2UW	4UW

\*(width) 2UW=62mm(2 7/16 inch)

<b>Mounting Rack</b>	13UW wide, 4U high, 19 inch 4.55 kg
<b>Blank Front Panel</b>	Available in 1UW, 2UW, 3UW, 4UW width
<b>Power</b>	+13 Vdc or 120/240 volt, 50/60 Hz AC with SMPS12 power supply or PS12 power supply
<b>Channel Capacity</b>	100 Channels, BCD coded 00-99
<b>Tone Squelch</b>	Fully programmable, one EIA Tone per channel
<b>Programming</b>	Through serial port of IBM compatible PC
<b>Software</b>	TechHelp (Dos) or Service Monitor (Win 95/98/XP), WinTekHelp (for Series 50)
<b>Test &amp; Diagnostics</b>	Front panel test connector and ALM, SQ, ALC, Tx and PWR LEDs
<b>Audio Response</b>	Selectable flat or 750uSec pre/de-emphasis
<b>Audio Interface</b>	Standard 600 Ohm 0dBm balanced and Hi-Z unbalanced

<b>Receivers</b>	<b>R50</b>	<b>R71</b>	<b>R150</b>	<b>R220</b>	<b>R350</b>	<b>R500</b>	<b>R800</b>
<b>Frequency spread for 1dB degradation</b>	25 MHz	15 MHz	20 MHz	25 MHz	5 MHz	10 MHz	25 MHz

<b>Frequency stability</b>	1 ppm standard ( TCXO ) Temp -30 to +60C
<b>Sensitivity</b>	0.25 uV (-119 dBm) for 12 dB SINAD, 0.35 uV (-116 dBm) for 20 dB Quieting
<b>Spurious &amp; Image</b>	Rejection 90 dB
<b>Selectivity</b>	80 dB at 25 kHz spacing per RS-204-C, 70 dB at 12.5 kHz spacing
<b>Intermodulation</b>	80 dB per RS-204-C
<b>Modulation acceptance</b>	7.5 and 3.75 kHz
<b>Squelch</b>	Noise squelch, adjustable from 6 to 26 dB SINAD Carrier squelch, adjustable from 1 to 200 uV
<b>Audio response</b>	+1 to -3 dB
<b>Audio level</b>	600 Ohm line adjustable from -10 to +10 dBm Monitor output, 3 watts @ 4 Ohms Discriminator & subtone output 1 V peak at 100% system deviation
<b>Audio Distortion</b>	Less than 3 % at 1 kHz, 60% system deviation with 750 uSec de-emphasis
<b>COS output</b>	Opto-coupled +12V, GND and free Switch connections
<b>Alarms</b>	Unlock, tuning voltage, signal strength, external mute and supply voltage

Exciters / Transmitters	T50	T70	T150	T220	T350	T500	T800
<b>Frequency spread</b>	25 MHz	15 MHz	20 MHz	2 MHz	5 MHz	10 MHz	25 MHz
<b>Frequency stability</b>	+/- 2.5 ppm standard			1 ppm standard			
<b>Power output adjustable</b>	0.5 to 1 watt			5 to 25 watts			1 to 15 watts
<b>Power regulation</b>	+/- 10% from 12-16 Vdc, 0 to 50 deg C, all channels						
<b>Duty Cycle</b>	100% to 40 deg C Temp -30 to +60C						
<b>Carrier &amp; modulation attack time</b>	Less than 20 mSec						
<b>Spurious and harmonics</b>	Less than 0.25 uW (-36dBm)						
<b>Audio response</b>	+1 to -3 dB						
<b>Audio distortion</b>	Less than 3% at 60% system deviation at 1 kHz						
<b>Residual hum &amp; noise</b>	Less than -50 dB relative to 60% system deviation						
<b>Audio input level</b>	600 Ohm line, -30 to +10 dBm Hi-Z input, 25 mV to 1 Vrms Subtone input compatible with receivers, Test microphone, 6 mV rms at 200 Ohms						
<b>Remote keying</b>	DC Opto-coupled input						
<b>External ref. option</b>	Allows the transmitter to be phase locked to an external 1 MHz reference						
<b>Alarms</b>	Unlock, tuning voltage, forward and reverse power, time out and supply voltage						

DC Power Consumption (DC Amps)	R50	R71A	R150	R220	R350	R500	R800
Idle	0.50	0.40	0.39	0.39	0.42	0.43	0.41
50% vol.	0.55	0.48	0.48	0.48	0.52	0.51	0.51
100% vol.	0.60	0.65	0.66	0.66	0.68	0.68	0.69

Transmitter		Standard					50 Watt PA		100 Watt PA		
Tx Model	Idle	2W	5W	10W	15W	25W	35W	50W	50W	75W	100W
T50	0.32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.0	7.5	11.5
T70	0.3	1.6	2.2	3.0	4.0	4.7	4.4	6.0	n/a	n/a	n/a
T150	0.3	1.8	2.5	3.3	3.9	5.0	5.0	6.2	10.0	12.0	14.4
T220	0.2	2.3	3.2	4.2	5.0	6.6	n/a	n/a	n/a	12.8	15.0
T350	0.2	1.8	2.5	3.3	4.1	5.6	4.6	5.2	n/a	n/a	n/a
T500	0.2	2.3	3.2	4.2	5.0	6.6	4.4	4.8	12.0	15.0	17.6
T800	0.2	2.2	2.8	3.8	5.0	n/a	n/a	n/a	n/a	n/a	n/a

Note: for a repeater or base station add Rx, Tx and PA currents for a total figure

AC Power Input (AC Amps)		Quiescent			Tx On		PA On	
Switch Mode Supplies		Rx	Rx / Tx	Rx / Tx / PA	15W	25W	50W	100W
SMPS12-2	13.8 Vdc	0.18	0.21	0.21	0.67	0.58	1.22	2.14
SMPS28-1	28.0 Vdc	0.085	0.175	0.213	n/a	0.73	0.98	1.38
Linear Supply		Quiescent			Tx On		PA On	
PS12	13.8 Vdc	Rx	Rx / Tx	Rx / Tx / PA	15W	25W	50W	100W
		0.08	0.11	0.11	0.67	0.75	1.37	2.35

We reserve the right to alter specifications or design without notice. In any special critical application please consult with the manufacturer. This publication is issued to provide an outline of specifications of the products shown. It is not to form an order or contract or be regarded as a representation of the product unless agreed to in writing by the company.

# **Eclipse System Overview - What is Eclipse?**

## **Radio System Components**

- Receivers
- Transmitters
- Power Amplifiers
- Power Supplies
- Interface and Control Modules

## **Configurable for a variety of applications**

- Base Local/Remote
- Repeater
- Shared Repeater
- Trunked Systems
- Links
- Paging/RF Modem
- Satellite Receiver/Voting
- Simulcast

# Module Features - Receivers

## Frequencies

25-50 MHz  
66-88 MHz  
136-174 MHz (2 Bands)  
215-240 MHz  
300-400 MHz (4 Bands)  
400-520 MHz (4 Bands)  
746-806 MHz (2 Bands)  
800-830 MHz  
850-870 MHz  
896-930 MHz

**Channel Spacing** 12.5, 15, 20, 25, 30 KHz

**Frequency Steps** 5/6.25 KHz, 10/12.5 KHz

## Audio Response

Flat  
750 uSec de-emphasis

## Audio Output

Direct Coupled  
600 Ohm Transformer  
Sub-Audible  
Monitor Loudspeaker

## Squelch

Noise Squelch

Preset Range 6 – 26dB SINAD  
Programmable fast turn off threshold

Carrier Squelch

Preset Range -120dBm to -70 dBm  
Fast 10 mSec operation

Tone Squelch

TIA/EIA-603 CTCSS decoder  
Programmable one tone per channel

## Control I/O

Opto-coupled COS output  
DC Loop  
Free switch

External Mute input

Channel Select 0-99 BCD input

# Module Features – Transmitters

## Frequencies

25-50 MHz	(3 Bands)
66-88 MHz	
136-174 MHz	(2 Bands)
215-240 MHz	
300-400 MHz	(4 Bands)
400-520 MHz	(4 Bands)
746-806 MHz	(2 Bands)
800-830 MHz	
850-870 MHz	
928-941 MHz	

**Power** 1-25 Watts

**Channel Spacing** 12.5, 15, 20, 25, 30 KHz

**Frequency Steps** 5/6.25 KHz, 10/12.5 KHz

## Audio Response

Flat

750 uSec pre-emphasis

## Audio Input

Direct Coupled  
600 Ohm Transformer  
Test Microphone  
Sub Audible

## Tone Squelch

TIA/EIA-603 Encoder  
Programmable one tone per channel (CTCSS)

Compatible Squelch Tail Elimination  
TIA/EIA-603 reverse phase  
Plus programmable No Tone Period

## Control I/O

Direct PTT Input  
DC Loop PTT input  
T/R driver output  
Channel Select 0-99 BCD input

## Module Features - Power Amplifiers

Frequency		Power
25-50MHz	(3 Bands)	100W
66-88 MHz		50W
136-174 MHz	(2 Bands)	50W, 100W
215-240 MHz		100W
300-400 MHz	(4 Bands)	50W
400-520 MHz	(4 Bands)	50W, 100W
850-870 MHz		75W

Automatic Level Control  
Adjustable output power via internal potentiometer  
DC Voltage Regulates Output Power  
Temperature Protection  
VSWR Protection

# Power Supply Modules

## **LINEAR POWER SUPPLY**

**Model: PS12**

15A/20A @ 13.8 Vdc Output  
110-120 Vac or 220, 240 Vac 50-60 Hz Input  
Four Eclipse Units Wide

## **SWITCH MODE POWER SUPPLY**

**Model: SMPS12-2**

35A @ 13.8 Vdc Output  
110-120 Vac or 220-240 Vac 50-60 Hz Input  
Two Eclipse Units Wide

**Model: SMPS28** for 50 Series modules

16A @ 28.0 Vdc Output  
110-120 Vac or 220-240 Vac 50-60 Hz Input  
Two Eclipse Units Wide



# Ancillary Modules and Products

## **Control/ Interface Modules**

Voting Tone Encoder - Mobicom Compatible

Key Tone Decoder - 2970 Hz

ATI – Alarm Trunking Interface

## **SSAS – Solid State Antenna Switch (T/R Switch)**

Solid State - 100W

25-240 MHz (6 Bands)

400-520 MHz (2 Bands)

## **Fan Unit**

Cools Sub-Rack

May be turned ON by Tx activity

Turned ON by Tx T/R output (4)

Timed Shut Off - 3 Minutes

## **Battery Charger**

Trickle Charge/ Float

Auto Change Over

Open collector output (Switching)

## **Heart Beat Timer**

Adjustable from a few seconds to several minutes to key up transmitter

# Eclipse Mounting Rack

**Rack Width** - 13UW wide,

**Rack Height** - 4U high,

**Mounting** - 19 inch, 4.55 Kg

A Eclipse module (e.g. Rx or Tx) = 2UW = 62mm (2 7/16 inch)

1UW = 31.75mm (1.25 inch) Width including clearance

## Module Widths

1UW - Key Tone Decoder, Voting Tone Encoder

2UW - Rx, Tx, SMPS

3UW - Power Amplifier 50/100W VHF, 50W UHF

4UW - Linear Power Supply, Power Amplifier 100W HF

4UW - Power Amplifier 100W UHF (new fan unit)

**Connector Boards** - Rx, Tx, PA/PS, Universal

**Back Planes** - Alarm & Trunking Interface

**Options** - Battery Charger Change Over, Heart Beat Timer

# System Configuration and Installation

## Rack Installation

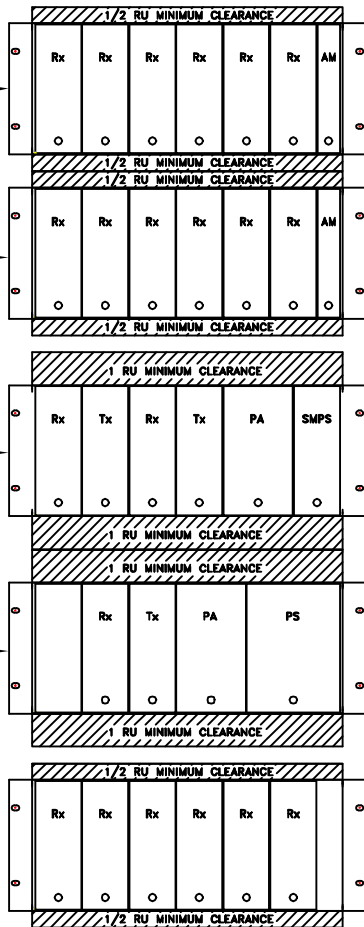
Minimum clearance above/below for cooling  
1/2 RU for low power modules  
1 RU for high power modules

Remove modules from rack for shipment

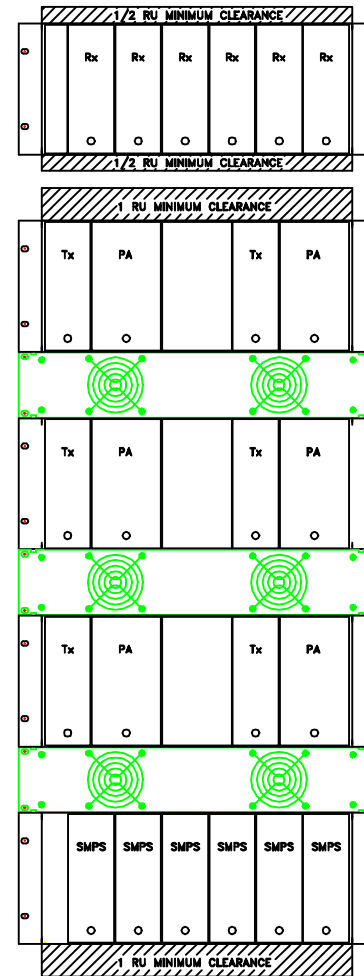
## Rack Layout

Heavy modules ( PA, PS) on end  
PA modules close to PS and Tx  
Keep Tx and Rx 75 mm from transformers and fans  
to reduce a.c. induction, vibration and noise.

LOW POWER MODULES,  
CONVECTION COOLED



MIXED POWER MODULES,  
CONVECTION COOLED



LOW POWER MODULES,  
CONVECTION COOLED

HIGH POWER MODULES,  
FORCED AIR COOLED

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Drawn	Scale	Issue	Rev

GENERAL TOLERANCES  
 0.20 ± 0.1  
 0.40 ± 0.20  
 0. ± 0.5

THIRD ANGLE PROJECTION  
 UNLESS OTHERWISE STATED ALL DIMENSIONS IN MM. — DO NOT SCALE

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