

## Switched Attenuator 0-30dB 0.25W (10-000701)

10-000701 provides attenuation from 0 - 30dB in 2 dB steps. The attenuation is simply set using the four miniature toggle switches on the top of each unit. Each switch is clearly marked with the attenuation it provides, and the total attenuation in line is the sum of the values switched in. They are designed to maintain an accurate 50Ω impedance over their operating frequency at both input and output.

### 10-000701 Specification

PARAMETER		SPECIFICATION
Attenuation Values		0-30dB
Attenuation Steps		2, 4, 8 and 16dB
Power Handling		0.25 Watt
Attenuation Accuracy		± 1.0 dB
Frequency Rang		DC to 1GHz
Impedance		50Ω
Connectors		SMA
VSWR		1.3:1
Weigh		0.2kg
Temperature range	operation	-20°C to +60°C
	storage	-40°C to +70°C

Description

The equipment is fitted with a wide dynamic range Automatic Gain Control (AGC) system. This is generally fitted in the Uplink path (not usually needed in the downlink path, as the signal here is at an almost constant level), to avoid overloading the amplifiers (with the associated performance degradation) should a mobile be operated very close to the unit.

The AFL wide dynamic range Automatic Gain Control system consists of two units, a detector/amplifier and an attenuator. The detector/amplifier unit is inserted in the RF path on the output of the power amplifier, and the attenuator is situated in the RF path between the 1st and 2nd stages of amplification.

Normally the attenuator is at minimum attenuation. The detector/amplifier unit monitors the RF level being delivered by the power amplifier, and when a certain threshold is reached it begins to increase the value of the attenuator to limit the RF output to the (factory set) threshold. Therefore overloading of the power amplifier is avoided.

The factory set threshold is 1dB below the Enhancer 1dB compression point. Some adjustment of this AGC threshold level is possible, a 10dB range is mostly achieved. It is not recommended under any circumstances to adjust the AGC threshold to a level greater than the 1dB compression point as system degradation will occur.

The detector comprises of a 50Ω transmission line with a resistive tap which samples a small portion of the mainline power. The sampled signal is amplified and fed to a conventional half wave diode rectifier, the output of which is a DC voltage proportional to the RF input signal.

This DC voltage is passed via an inverting DC amplifier with integrating characteristics, to the output, which drives the attenuation control line of the corresponding AGC attenuator. This unit is fitted at some earlier point in the RF circuit.

The unit contains a 12V DC regulator in the detector module, which supplies stabilised voltage to the DC amplifier and via an external cableform to the AGC attenuator.

For small signals, below AGC onset, the output control line will be close to 12V and the AGC attenuator will have minimum attenuation. As the signal level increases the control line voltage will fall, increasing the attenuator value and keeping the system output level at a constant value. The AGC onset level is adjusted by the choice of sampler resistor R1 and by the setting of potentiometer VR1, (factory set @ time of system test) do not adjust unless able to monitor subsequent RF levels.

The attenuator comprises a 50Ω P.I.N diode, voltage-variable attenuator with a range of 3 to 30dB. The attenuation is controlled by a DC voltage which is derived from the associated AGC detector unit.

### Technical Specification

PARAMETER		SPECIFICATION
Frequency range:		up to 1000MHz
Attenuation range:		3 to 30dB
Attenuation steps:		continuously variable
VSWR:		better than 1.2:1
RF Connectors:		SMA female
Power handling:	attenuator:	1W
	detector/amp:	>30W (or as required)
Temperature range:	operation:	-10°C to +60°C
	storage:	-20°C to +70°C
Size:	attenuator (pcb)	50 x 42 x 21mm
	Detector (pcb)	54 x 42 x 21mm
Weight:	attenuator:	90grams
	detector/amp:	100grams

DC/DC Converter, 24V in, 12V 5A out (96-200024)

This unit it is an O.E.M high power device with a 5 amp @ 12V (60Watts) output capability used to derive a 12V fixed voltage power supply rail from a 24V supply. In the event of failure this unit should not be repaired, only replaced.

96-200024 Specification

PARAMETER		SPECIFICATION
Input Voltage range		18-28V DC
Output voltage		12V±0.5V
Max. current load		5.0Amps
Temperature range	operation	-10°C to +60°C
	storage	-20°C to +70°C

## 12V Relay Board + LED (80-008909)

Relay Board (80-008909) allows the inversion of signals and the isolation of circuits. It is equipped with a single dual pole change-over relay RL1, with completely isolated wiring, accessed via a 15 way in-line connector.

The relay is provided with polarity protection diodes and diodes for suppressing the transients caused by "flywheel effect" which can destroy switching transistors or induce spikes on neighbouring circuits. It's common use is to amalgamate all the alarm signals into one, volts-free relay contact pair for the main alarm system. This relay board also carries an LED to serve as a "Status OK" indicator which is illuminated during normal operation.

### 80-008909 Specification

PARAMETER		SPECIFICATION
Operating voltage		8 to 30V (floating earth)
Alarm threshold		Vcc - 1.20 volt +15%
<b>Alarm output relay contacts</b>		
Max. switch current		1.0Amp
Max. switch volts		120Vdc/60VA
Max. switch power		24W/60VA
Min. switch load		10.0µA/10.0mV
Relay isolation		1.5kV
Mechanical life		>2x10 <sup>7</sup> operations
Relay approval		BT type 56
Connector details		Screw terminals
Temperature range	operational	-10°C to +60°C
	storage	-20°C to +70°C

## 80-008909 12V RELAY PCB ASSEMBLY WITH LED \*\*//\*\*

Line Item No	Component Part	Component Part Description	Qty Per Assembly
1	80-008927	12V RELAY PCB	1
2	91-700016	IDC 15 WAY 0.1'R/A LOCK.HDR	1
3	93-630038	1K2R 0.125W 2% 1206 RESISTOR CHIP	1
4	94-150001	LL4148 G:P MINIMELF DIODE SMD	2
5	96-700008	GREEN LED S.M.D [tape/reel]	1
6	96-910008	12V SUB-MIN SMD DPCO RELAY TQ2SA	1

## 24V Relay Board (80-008902)

The General Purpose Relay Board allows the inversion of signals and the isolation of circuits. It is equipped with a single, dual pole, change-over relay RL1 with completely isolated wiring, accessed via screw terminals.

The relay is provided with a polarity protection diode and diodes for suppressing the transients caused by "flywheel effect" which can destroy switching transistors or induce spikes on neighbouring circuits. It's common use is to amalgamate all the alarm signals into one, volts-free relay contact pair for the main alarm system.

### 80-008902 Specification

Parameter		Specification
Max. switch current		1.0Amp
Max. switch volts		120Vdc/60VA
Max. switch power		24W/60VA
Min. switch load		10.0µA/10.0mV
Relay isolation		1.5kV
Mechanical life		>2x10 <sup>7</sup> operations
Relay approval		BT type 56
Connector details		15-way 0.1" pitch
Temperature range	operational	-10°C to +55°C
	storage	-40°C to +70°C

## 24V Relay Board (20-001602)

### Description

The General Purpose Relay Board allows the inversion of signals and the isolation of circuits. It is equipped with two dual pole change-over relays RL1 and RL2, with completely isolated wiring, accessed via screw terminals.

Both relays are provided with polarity protection diodes and diodes for suppressing the transients caused by "flywheel effect" which can destroy switching transistors or induce spikes on neighbouring circuits. It's common use is to amalgamate all the alarm signals into one, volts-free relay contact pair for the main alarm system.

Note that the board is available for different voltages (12 or 24V) depending on the type of relays fitted at RL1 and RL2.

### Technical Specification

PARAMETER	SPECIFICATION
Operating voltage:	8 to 30V (floating earth)
Alarm Threshold:	Vcc - 1.20 volt $\pm$ 15%
<b>Alarm output relay contacts:</b>	
Max. switch current:	1.0Amp
Max. switch volts:	120Vdc/60VA
Max. switch power:	24W/60VA
Min. switch load:	10.0 $\mu$ A/10.0mV
Relay isolation:	1.5kV
Mechanical life:	>2x10 <sup>7</sup> operations
Relay approval:	BT type 56
Connector details:	Screw terminals
Temperature range	operational: -10°C to +60°C
	storage: -20°C to +70°C



## AGC Attenuator Module (17-001201)

The AFL Automatic Gain Control system consists of two units, a detector/amplifier and an attenuator. The detector/amplifier unit is inserted in the RF path on the output of the power amplifier, and the attenuator is situated in the RF path between the 1st and 2nd stages of amplification. However, in this case only the attenuator is employed as part of the simplex control system.

The attenuator comprises a 50Ω P.I.N diode, voltage-variable attenuator with a range of 3 to 30dB. The attenuation is controlled by a DC voltage which is derived in this instance from the associated Simplex controller board.

## DC/DC Converter, 24V in, 12V 8A out (13-003011)

The DC/DC converter fitted is an AFL assembled, high power PCB unit with an 8 amp @ 12V output capability. The circuit is basically an O.E.M semiconductor regulator (one side of which has a heatsink mounting plate, that is usually bolted to the casing of a Cell Enhancer) and smoothing components built onto a printed circuit board with screw block terminations.

In the unlikely event of failure this unit should not be repaired, only replaced.

### 13-003011 Specification

PARAMETER		SPECIFICATION
Input voltage range		18-28V DC
Output voltage		12V±0.5V
Max. current load		8.0Amps
Temperature range	operation	-10°C to +60°C
	storage	-20°C to +70°C
Size(PCB)		190 x 63mm
Weight (Loaded PCB)		291g

## DC/DC Converter, 24V in, 12V 8A out (13-003011)

### Description

The DC/DC converter fitted is an AFL assembled, high power PCB unit with an 8 amp @ 12V output capability. The circuit is basically an O.E.M semiconductor regulator (one side of which has a heatsink mounting plate, that is usually bolted to the casing of a Cell Enhancer) and smoothing components built onto a printed circuit board with screw block terminations.

Note: no circuit diagram of the O.E.M. regulator is available. This unit should not be repaired, only replaced.

### Technical Specification

PARAMETER		SPECIFICATION
Input voltage range:		18-28V DC
Output voltage:		12V±0.5V
Max. current load:		8.0Amps
Temperature range:	operation:	-10°C to +60°C
	storage:	-20°C to +70°C
Size(PCB):		190 x 63mm
Weight (Loaded PCB):		291gms

## VHF Power Amplifier 5W (12-025602)

Power amplifier 12-025602 is a multi-stage, solid state power amplifier. Class A circuitry is employed throughout the device to ensure excellent linearity over a wide dynamic frequency range. All the semiconductor devices are very conservatively rated to ensure low device junction temperatures and a long, trouble free working lifetime. There is a Current Fault Alarm Function, which indicates failure of each RF transistor with an open collector of a NPN transistor. A relay is fitted to indicate the failure by voltage free change over the relay contacts.

The power amplifier should require no maintenance over its operating life. Under no circumstances should the cover be removed or the side adjustments disturbed unless it is certain that the amplifier has failed; since it is critically aligned during manufacture and any re-alignment will require extensive test equipment.

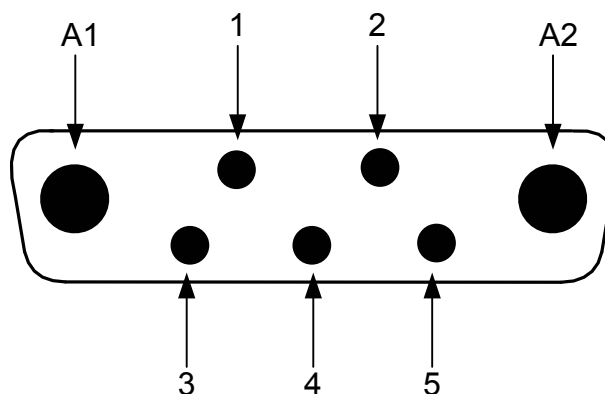
The unit housing is an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

### 12-025602 Specification

PARAMETER		SPECIFICATION
Frequency range		108 to 174 MHz (as required)
Maximum RF output		>5Watts
Gain		≥ 34 dB
1dB compression point		≥ 37 dBm Min
3rd order intercept point		≥ 48 dBm Min
In / RL		16 dB Min
Out / RL		15 dB Min
Noise Figure		≤ 9.5 dB Max
Connectors		SMA female
Supply		24 +/- 0.5 Vdc @ 1040 mA Max
Temperature range	operational	-10°C to +60°C
	storage	-20°C to +70°C

7-Way Connector Pin-out details	
Connector Pin	Signal
A1 (large pin)	+10-24V DC
A2 (large pin)	GND
1	Alarm relay common
2	TTL alarm/0V good
3	Alarm relay contact (bad)
4	Alarm relay contact (good)
5	O/C good/0V bad (TTL)

### 7-Way Connector Graphical Representation



**PART NO: 12-025602**

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### Description

This amplifier is dedicated to be a class A 5.0 W driver from 108 MHz to 174MHz. The amplifier is in 3-stage single ended configuration demonstrating a state of the art linearity as well as very good input/output VSWR. There is a Current Fault Alarm Function, which indicates failure of each RF transistor with an open collector of a NPN transistor. A relay is fitted to indicate the failure by voltage free change over the relay contacts.

The amplifier is housed in an aluminium case (Alocrom 1200 finish) with SMA connectors for the RF input/output and a D-type connector for power supply and Current Fault Alarm Function.

### Electrical Specifications

#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Unit	Max. value
Vdc	DC Voltage	V	26
Pin	RF Input Power	dBm	20
Tstg	Storage temperature	°C	-40 to +100
Tf	Operating temperature	°C	-20 to +70

### Performance

Parameters	Guaranteed
Temperature	-20 to +70°C
Frequency Range	108 to 174 MHz
Small Signal Gain	≥ 34 dB
Gain Flatness	1.6 dB p-p Max
ΔGain vs. Temperature	2.5 dB Max
In / RL	16 dB Min
Out / RL	15 dB Min
Noise Figure	≤ 9.5 dB Max
Output Power @ 1dB Compression Point	≥ 37 dBm Min
Output 3 <sup>rd</sup> Order IP	≥ 48 dBm Min
Supply Voltage	24 +/- 0.5 Vdc
DC Supply Current	1040 mA Max

Mechanical Specifications: Outline Drawing 12-025692

Drawing series: 12-025602

Test Specification: AF3920

## Low Power Amplifier (1Watt) (12-021801)

The low power amplifier used is a 1 stage balanced configuration, solid-state amplifier. Class A circuitry is used in the unit to ensure excellent linearity over a very wide dynamic range. The three active devices are very moderately rated to provide a long trouble-free working life.

Its housing is an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

There are no adjustments on this amplifier, and in the unlikely event of failure then the entire amplifier should be replaced.

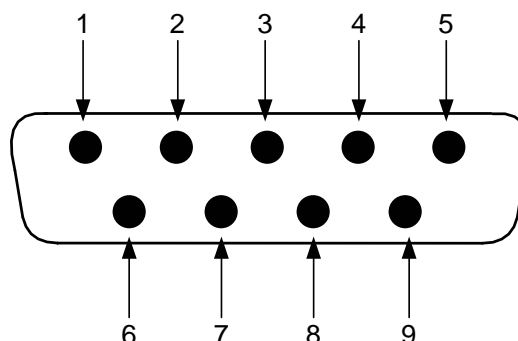
### 12-021801 Specification

PARAMETER		SPECIFICATION
Temperature		-20 to +70 °C
Frequency Range		380 - 500 MHz
Small Signal Gain		15.5 +/- 0.5 dB
Gain Flatness		0.7 dB p-p Max
ΔGain vs. Temperature		0.7 dB Max
In RL		20 dB Min
Out RL		20 dB Min
Output Power @ 1dB Compression Point		30.5 dBm Min
Output 3 <sup>rd</sup> Order IP		41.5 dBm Min
Noise Figure		6 dB Max
DC Supply Voltage		10-15 Vdc
DC Supply Current		540 mA Max
Temperature range:	operational:	-10°C to +60°C
	storage:	-40°C to +100°C
Weight:		<0.5 kg
Size:		110.5 x 66mm x 24.6mm

### Low Power Amplifier (12-021801) 9-Way Connector Pin-outs

Connector pin	Signal
1	+ve input (10-24V)
2	GND
3	Alarm relay O/P bad
4	Alarm relay common
5	Alarm relay good
6	No connection
7	TTL voltage set
8	TTL alarm/0V (good)
9	O/C good/0V bad

9-Way Pin-Out Graphical Representation



# PRODUCT SPECIFICATION

**Part No: 12-021801, Rev. 1**

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## Description

This is a 15dB gain Low Power Amplifier operating in the frequency band of 380-500MHz. The amplifier is in 1 stage balanced configuration demonstrating very good linearity as well as very good input/output VSWR. There is a Current Fault Alarm Function, which indicates failure of each one or both RF transistors by a various alarm output options. The amplifier is housed in an aluminium case (Alocrom 1200 finish) with SMA connectors for the RF input/output and a 9way D-type for DC and alarm outputs.

## Electrical Specifications

### **Absolute maximum ratings**

Symbol	Parameter	Unit	Max. value
Vdc	DC Voltage	V	15V
Pin	RF Input Power	dBm	25 dBm
Tstg	Storage temperature	°C	-40 to +100
Tf	Operating temperature	°C	-20 to +70

### **Performance**

Parameters	Guaranteed	Guaranteed	Units
Temperature	+25	-20 to +70	°C
Frequency Range	380 - 500		MHz
Small Signal Gain	15.5 +/- 0.5		dB
Gain Flatness	.5	0.7	dB p-p Max
ΔGain vs. Temperature		0.7	dB Max
In RL	20	20	dB Min
Out RL	20	20	dB Min
Output Power @ 1dB Compression Point	31	30.5	dBm Min
Output 3 <sup>rd</sup> Order IP	42	41.5	dBm Min
Noise Figure	5.5	6	dB Max
DC Supply Voltage	10-15		Vdc
DC Supply Current	530	540	mA Max

Mechanical Specifications: See Outline Drawing 12-021891.

Drawing series: 12-0218

\*12-021801 is fitted with a relay to give voltage free contacts as alarm status output.

## 5Watt Tetra Amplifier (12-021601)

Power amplifier 12-021601 is a multi-stage, solid state power amplifier. Class A circuitry is employed throughout the device to ensure excellent linearity over a wide dynamic frequency range. All the semiconductor devices are very conservatively rated to ensure low device junction temperatures and a long, trouble free working lifetime.

The power amplifier should require no maintenance over its operating life. Under no circumstances should the cover be removed or the side adjustments disturbed unless it is certain that the amplifier has failed; since it is critically aligned during manufacture and any re-alignment will require extensive test equipment.

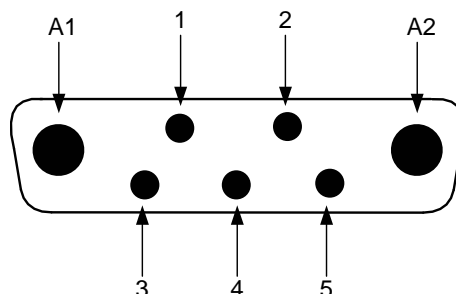
The unit housing is an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

### 12-021601 Specification

PARAMETER		SPECIFICATION
Frequency range:		380-470MHz (as required)
Bandwidth:		10-40MHz (typical, tuned to spec.)
Maximum RF output:		>5Watts
Gain:		>30dB
1dB compression point:		+37.5dBm
3 <sup>rd</sup> order intercept point:		+50dBm
VSWR:		better than 1.5:1
Connectors:		SMA female
Supply:		1.9Amps @ 12V DC
Weight:		1kg (excluding heatsink)
Temperature range:	operational:	-10°C to +60°C
	storage:	-20°C to +70°C

7-Way Connector Pin-out details	
Connector Pin	Signal
A1 (large pin)	+10-24V DC
A2 (large pin)	GND
1	Alarm relay common
2	TTL alarm/0V good
3	Alarm relay contact (bad)
4	Alarm relay contact (good)
5	O/C good/0V bad (TTL)

### 7-Way Pin-Out Graphical Representation





## 20W Power Amplifier (12-020501)

This amplifier is a Class A 20W power amplifier from 800-960MHz in a 1 stage balanced configuration. It demonstrates a very high linearity and a very good input/output return loss (RL). It has built in a Current Fault Alarm Function.

Its housing is an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

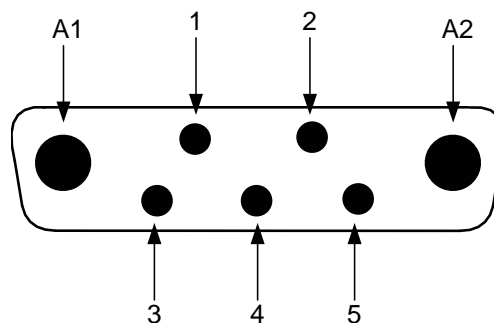
### 12-020501 Specification

PARAMETER		SPECIFICATION
Frequency range		800-960MHz
Small signal gain		31.5dB
Gain flatness		±0.6dB
I/O Return loss		>18dB
1dB compression point		43.5dBm
OIP3		54dBm
Supply voltage		24V DC
Supply current		4.6Amps @12V(typical)
Temperature range	operational	-10°C to +60°C
	storage	-20°C to +70°C
Weight		<2kg (no heatsink)

### PA 7-Way Connector Pin-outs

Connector Pin	Signal
A1 (large pin)	+10-24V DC
A2 (large pin)	GND
1	Alarm relay common
2	TTL alarm/0V good
3	Alarm relay contact (bad)
4	Alarm relay contact (good)
5	O/C good/0V bad (TTL)

7-Way Connector Graphical Representation



## 5W Power Amplifier (12-018601)

This amplifier is a Class A 5W power amplifier from 800MHz to 960MHz in a 1 stage balanced configuration. It demonstrates a very high linearity and a very good input/output return loss (RL). It has built in a Current Fault Alarm Function.

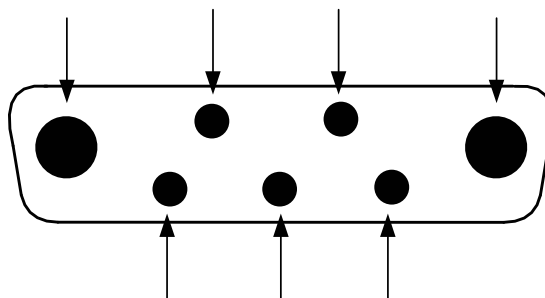
Its housing is an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

### 12-018601 Specification

PARAMETER		SPECIFICATION
Frequency range		800-960MHz
Small signal gain		30dB
Gain flatness		±0.5dB
I/O Return loss		>20dB
1dB compression point		+37dBm
OIP3		+52dBm
Supply voltage		12V DC
Supply current		2.0Amps (typical)
Temperature range	operational	-10°C to +60°C
	storage	-20°C to +70°C
Weight		<2kg (no heatsink)

### PA 7-Way Connector Pin-outs

Connector Pin	Signal
A1 (large pin)	+12V DC
A2 (large pin)	GND
1	Alarm relay common
2	TTL alarm/0V good
3	Alarm relay contact (bad)
4	Alarm relay contact (good)
5	O/C good/0V bad (TTL)



Description

This amplifier is a Class A 20W power amplifier from 380MHz to 470MHz in a 1 stage balanced configuration. It demonstrates a very high linearity and a very good input/output return loss (RL). It has built in a Current Fault Alarm Function.

Its housing is an aluminium case (Alocrom 1200 finish) with SMA connectors for the RF input/output and a D-Type connector for the power supply and the Current Fault Alarm Function.

Technical Specification

PARAMETER		SPECIFICATION
Frequency range:		380-470MHz
Small signal gain:		23dB
Gain flatness:		±1.7dB
I/O Return loss:		>18dB
1dB compression point:		+43dBm
OIP3:		+55dBm
Supply voltage:		24V DC
Supply current:		3.8Amps (Typical)
Temperature range:	operational:	-10°C to +60°C
	storage:	-20°C to +70°C
Weight:		<2kg (no heatsink)

PA 7-Way Connector Pin-outs

Connector Pin	Signal
A1 (large pin)	+24V DC
A2 (large pin)	GND
1	Alarm relay common
2	TTL alarm/0V good
3	Alarm relay contact (bad)
4	Alarm relay contact (good)
5	O/C good/0V bad (TTL)

11-005902 Low Noise Amplifier

Description

The Gallium-Arsenide low noise amplifier used in the unit is a double stage, solid-state low noise amplifier. Class A circuitry is used throughout the units to ensure excellent linearity and extremely low noise over a very wide dynamic range. The active devices are very moderately rated to provide a long trouble-free working life. There are no adjustments on these amplifiers, and in the unlikely event of a failure, then the complete amplifier should be replaced. This amplifier features its own in-built alarm system which gives a volt-free relay contact type alarm that is easily integrated into the main alarm system.

Technical Specification

PARAMETER		SPECIFICATION
Frequency range:		800 – 960MHz
Bandwidth:		<170MHz
Gain:		19.5dB (typical)
1dB compression point:		21dBm
OIP3:		33dBm
Input/Output return loss:		>20dB
Noise figure:		1dB (typical)
Power consumption:		190mA @ 24V DC
Supply voltage:		10-24V DC
Connectors:		SMA female
Temperature range:	operational:	-10°C to +60°C
	storage:	-40°C to +70°C
Size:		90 x 55 x 30.2mm
Weight:		0.28kg

## Low Noise Amplifier (11-005401)

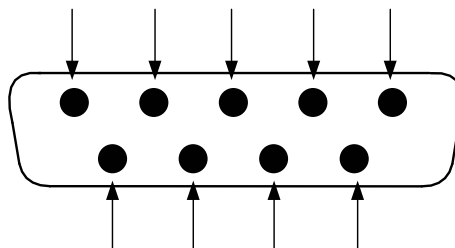
The 15dB gain low noise amplifier used in the unit is a double stage solid-state low noise amplifier. Class A circuitry is used throughout the units to ensure excellent linearity over a very wide dynamic range. The active devices are very moderately rated to provide a long trouble-free working life. There are no adjustments on these amplifiers, and in the unlikely event of a failure, the complete amplifier should be replaced. The amplifier is housed in an aluminium case (Iridite NCP finish) with SMA connectors for the RF input/output and a 9way D-type for DC and alarm outputs.

### 11-005401 Specification

PARAMETER		SPECIFICATION
Frequency range		380 - 500MHz
Bandwidth		<100MHz (as required, tuneable)
1dB compression point		>+20dBm
3rd order intercept		>+33dBm
Gain		>15.5dB (typical)
VSWR		better than 1.5:1
Input return loss		>14dB
Noise figure		<2.0dB (typical)
Connectors		SMA female
Supply		115mA at 12V DC
Temperature range	operational	-10°C to +60°C
	storage	-40°C to +70°C
Size		88 x 50 x 34mm (ex. connectors)
Weight		0.26kg

LNA 'D' Connector Pin-out details	
Connector pin	Signal
1	+ve input (10-24V)
2	GND
3	Alarm relay O/P bad
4	Alarm relay common
5	Alarm relay good
6	No connection
7	TTL voltage set
8	TTL alarm/0V (good)
9	O/C good/0V bad

### 9-Way Pin-Out Graphical Representation



Description

The equipment is fitted with an Automatic Gain Control (AGC) system. This is generally fitted in the Uplink path (not usually needed in the downlink path, as the signal here is at an almost constant level), to avoid overloading the amplifiers (with the associated performance degradation) should a mobile be operated very close to the unit.

Normally the attenuator is at minimum attenuation. The detector/amplifier unit monitors the RF level being delivered by the power amplifier, and when a certain threshold is reached it begins to increase the value of the attenuator to limit the RF output to the (factory set) threshold. Therefore overloading of the power amplifier is avoided.

The factory set threshold is 1dB below the Enhancer 1dB compression point. Some adjustment of this AGC threshold level is possible, a 10dB range is mostly achieved. It is not recommended under any circumstances to adjust the AGC threshold to a level greater than the 1dB compression point as system degradation will occur.

The detector comprises of a 50Ω transmission line with a resistive tap which samples a small portion of the mainline power. The sampled signal is amplified and fed to a conventional half wave diode rectifier, the output of which is a DC voltage proportional to the RF input signal.

This DC voltage is passed via an inverting DC amplifier with integrating characteristics, to the output, which drives the attenuation control line of the corresponding AGC attenuator. This unit is fitted at some earlier point in the RF circuit.

The unit contains a 12V DC regulator in the detector module, which supplies stabilised voltage to the DC amplifier and via an external cableform to the AGC attenuator.

For small signals, below AGC onset, the output control line will be close to 12V and the AGC attenuator will have minimum attenuation. As the signal level increases the control line voltage will fall, increasing the attenuator value and keeping the system output level at a constant value.

The AGC onset level is adjusted by the choice of sampler resistor R1 and by the setting of potentiometer VR1.

The attenuator comprises a 50Ω P.I.N diode, voltage-variable attenuator with a range of 3 to 30dB. The attenuation is controlled by a DC voltage which is derived from the associated AGC detector unit.

## Technical Specification

PARAMETER		SPECIFICATION
Frequency range:		up to 1000MHz
Attenuation range:		3 to 30dB
Attenuation steps:		continuously variable
VSWR:		better than 1.2:1
RF Connectors:		SMA female
Power handling:	attenuator:	1W
	detector/amp:	>30W (or as required)
Temperature range:	operation:	-10°C to +60°C
	storage:	-20°C to +70°C
Size:	attenuator pcb	50 x 42 x 21mm
	detector/amp pcb	54 x 42 x 21mm
Weight:	attenuator:	90grams
	detector/amp:	100grams

## 0.25Watt 0- -30dB Switched Attenuator (10-000701)

### General Application

In many practical applications for Cell Enhancers etc., the gain in each path is found to be excessive. Therefore, provision is made within the unit for the setting of attenuation in each path, to reduce the gain.

### Switched Attenuators

The AFL switched attenuators are available in two different types; 0 – 30dB in 2 dB steps (as in this case), or 0 – 15dB in 1 dB steps. The attenuation is simply set using the four miniature toggle switches on the top of each unit. Each switch is clearly marked with the attenuation it provides, and the total attenuation in line is the sum of the values switched in. They are designed to maintain an accurate 50Ω impedance over their operating frequency at both input and output.

10-000703 extended lid

10-000701 provides attenuation from 0 – 30dB in 2 dB steps The attenuation is simply set using the four miniature toggle switches on the top of each unit. Each switch is clearly marked with the attenuation it provides, and the total attenuation in line is the sum of the values switched in. They are designed to maintain an accurate 50Ω impedance over their operating frequency at both input and output.

Attenuation Values:	0-30dB part number 10-000701 & 10-000703
Attenuation Steps:	2,4,8 and 16dB
Power Handling:	0.25 Watt
Attenuation Accuracy:	± 1.0 dB
Frequency Range	DC to 1GHz
Connectors:	SMA
VSWR:	1.3:1
Weight	0.2kg