CELLTRONIK MICROWAVE
2029 Boul. Industrel, Laval, Quebec, Canada H7S 1P7
Tel: (450) 629-1145 Fax: (450) 629-1140

CA262DML CDMA & U850 Band High Power Amplifier

User/Maintenance Handbook

Version 1.0

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1 INTRODUCTION

This manual is written for the telecommunication equipment identified as CDMA & U850 Dual Band Amplifier. It is not to be used on any other equipment unless after consulting the engineer manager of Celltronik Microwave.

The function of this manual is to provide the user or maintainer with sufficient information to operate the equipment and to perform simple repair to the latter. For further adjustments or major repair, please contact your engineer at Celltronik Microwave.

This manual is written for the use of competent technicians. No liability will be accepted by Celltronik Microwave for the use or misuse of this manual, the information contained therein, or the consequences of any actions resulting from the use of the said information, including, but not limited to, descriptive, procedural, typographical, arithmetical, or listing errors.

Furthermore, Celltronik Microwave does not warrant the absolute accuracy of the information contained in this manual, or it's completeness for operation other than basic usage.

Celltronik Microwave has a policy of continuous product development and enhancement, and as such, reserves the right to amend alter, update and generally change the contents, appearance and pertinence of this document without notice.

We offer a One Year warranty on all our products from the date of shipment. The warranty is expressly on a return to base repair or exchanges basis and the warranty does not extend to on-site repair or complete unit exchange.

2 SAFETY CONSIDERATIONS

2.1 Electrical Shock

Electrical shocks cause by incompatible power supplies.
This hazard can be avoid or minimized by quality installation practice and thorough testing during:

a) Original assembly;
b) Commissioning, and
c) Regular intervals, thereafter.

All test equipment must be in good working order prior to its use. High current power supplies can be dangerous because of the possibility of substantial arcing. To be safe, always switch the equipment to off during connection and disconnection.

2.2 RF Radiation Hazard

RF radiation, (especially at microwave frequencies) arising from transmitter outputs connected to Celltronik's equipment, must be considered a safety hazard.

This condition might only occur if the cable is disconnected, or the output of the amplifier is not properly terminated. Either of these conditions would impair the system's efficiency. No investigation should be carried out until all RF power sources have been removed. This would always be a wise precaution, despite the severe mismatch between the impedance of an N type connector at 50Ω, and that of free space at 377Ω, which would severely mitigate against the efficient radiation of RF power. Radio frequency burns could also be a hazard, if any RF power carrying components were to be carelessly touched.

Antenna positions should be chosen to comply with requirements (both local & statutory) regarding exposure of personnel to RF radiation. When connected to an antenna, the unit is capable of producing RF field strengths, which may exceed guideline safe values especially if used with

antennas having appreciable gain. In this regard the use of directional antennas with backscreens and a strict site rule that personnel must remain behind the screen while the RF power is on, is strongly recommended.

Where the equipment is used near power lines, or in association with temporary masts not having lightning protection, the use of a safety earth connected to the case-earthing bolt is strongly advised.

2.3 Emergency Contact Numbers

The Celltronik Engineering Department can be contacted on:

Telephone: +852 35902626
Fax: +852 35903222
e-mail: eng@celltronik.com

3 OVERWIEW

The Celltronik CDMA & U850 Dual Band High Power Amplifier is simplex broadband family of linear amplifiers. It's ideal for extending two-way voice and data communications such as analog and digital cellular messaging services into buildings, tunnels, subways, garages and other shielded locations.

This model provides 50dB of gain for both Uplink and Downlink and gain adjustment is provided to allow precise gain control.

The Celltronik CC-813 Microprocessor Controller/Monitor system is provided to allow locally control of the gain adjustment, AGC setting and monitoring of various alarm functions including individual amplifier alarm status. The CC-813 may be connected remotely via a PSTN.

Physically, CA262DML is housed in a single wall mount steel case with environmental protection rating of IP65. Handles are provided for carrying the unit and the door is fitted with a lock. There is a dual color LED mount on the left bottom of the front door. The green LED indicates unit normal operation and the red LED indicates abnormal operation.

4 SPECIFICATIONS

4.1 Part Lists

CA262DML high power amplifier consists of:

Part No.	Description	Qty.
CD535F2	Dual Tx Band Pass Filter	2
CD535F1	Dual Rx Band Pass Filter	2
CD535DF	Dual Rx Band Pass Filter	1
CM851A	CDMA & U850 Rx Amplifier Module	2
CM850A	CDMA & U850 Tx Amplifier Module	2
CP402	28V 500W Switching Power Supply	1
CSP281	EMC Surge Protector	1
CC813	Amplifier Controller/Monitor	1
	Wall Mount Case 24”x16”x11”	1

4.2 Technical Specification

ITEM	PARAMETERS	DOWNLINK	UPLINK
1	Frequency Range : CDMA2000 U850	870—877.5 MHz 877.5—882.5 MHz	825—832.5 MHz 832.5—837.5MHz
2	Gain	50dB	50dB
3	Adjustable Gain Range	25 dB	25 dB
4	Pass Band Ripple	+/- 2 dB	+/- 2 dB
5	Power Output (meet the emission mask of 3GPP-TS25.106V.4.0.0 Section 6,7,8,9,10,11)	+43 dBm x 2 carriers +40 dBm x 4 carriers +37 dBm x 8 carriers	+33 dBm x 1 carrier +30 dBm x 2 carriers +27 dBm x 4 carriers +24 dBm x 8 carriers
6	AGC / ALC	Equipped	
7	IMD	-60dBc (Output Power=+43dBm)	- 45dBc
8	Return Loss	>15 dB	>15 dB
9	Noise Figure (Max. gain)	< 4 dB	< 4 dB
10	Maximum Input Power Without Damage	10 dBm	10 dBm
11	Output Protection	Equipped	Equipped
12	Compliance	Radio: 3GPP TS 05.05 (GSM & PCN) EMC: EN 301 489-1 Safety: UL60950	
13	Power Supply	100–240V/40-50Hz	
14	AC Surge Protection	Max. Surge Current: 6.5kA (8/20us) Limiting Voltage: <800V Impulse Energy Absorption: 420J	
15	Remote Control and Alarm Monitoring	Through Built-in Wireless Modem with Amplifier to Amplifier link (ATA)	
16	Wireless Modem Coupling Method	Through external Antenna	
17	Alarm	VSWR Low output Power (Threshold can be adjustable) Over Power Over Temperature Amplifier Fail AC Power	
18	DL Input and Output Power Monitoring	Equipped	
19	Active Report Alarm	Remote Alarm Call Back	

20	Backup Battery Operation Time	2 Hours for Modem operation during AC mains failure
21	High Temperature Protection	Equipped (Shut down at above 80˚C)
22	RF Ports	N-Female
23	Operating Temperature	-20 to +70˚C
24	Impedance	50 Ohm
25	MTBF	> 100,000 Hours
26	Mechanical Material	IP65, Wall Mounted
27	Weight	60kg
28	Heigh, Width	24” x 21” x 11”

4.3 CA262DML Block diagram and Layout diagram

The following pages are the CA262DML Block diagram and Layout diagram.

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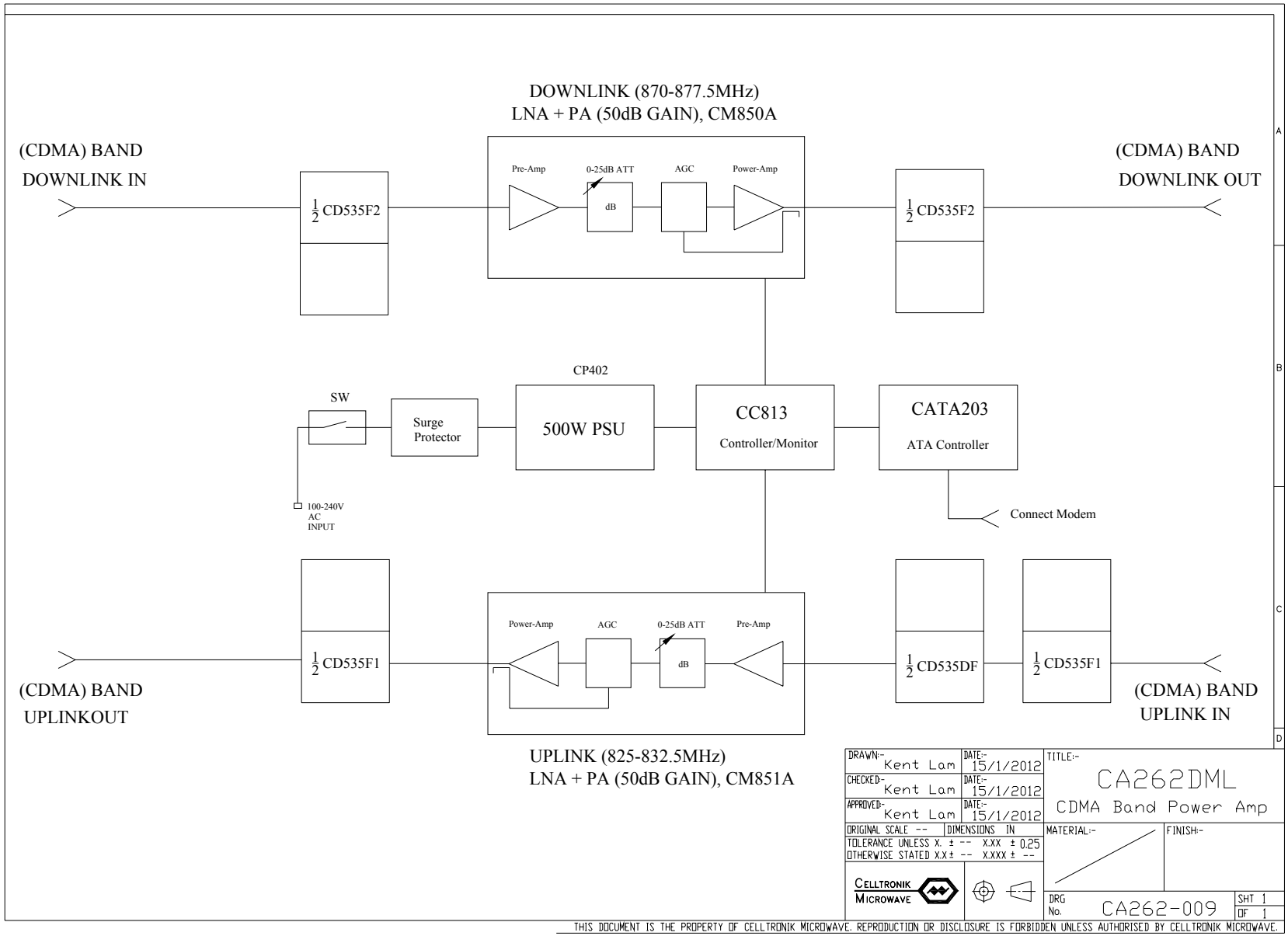

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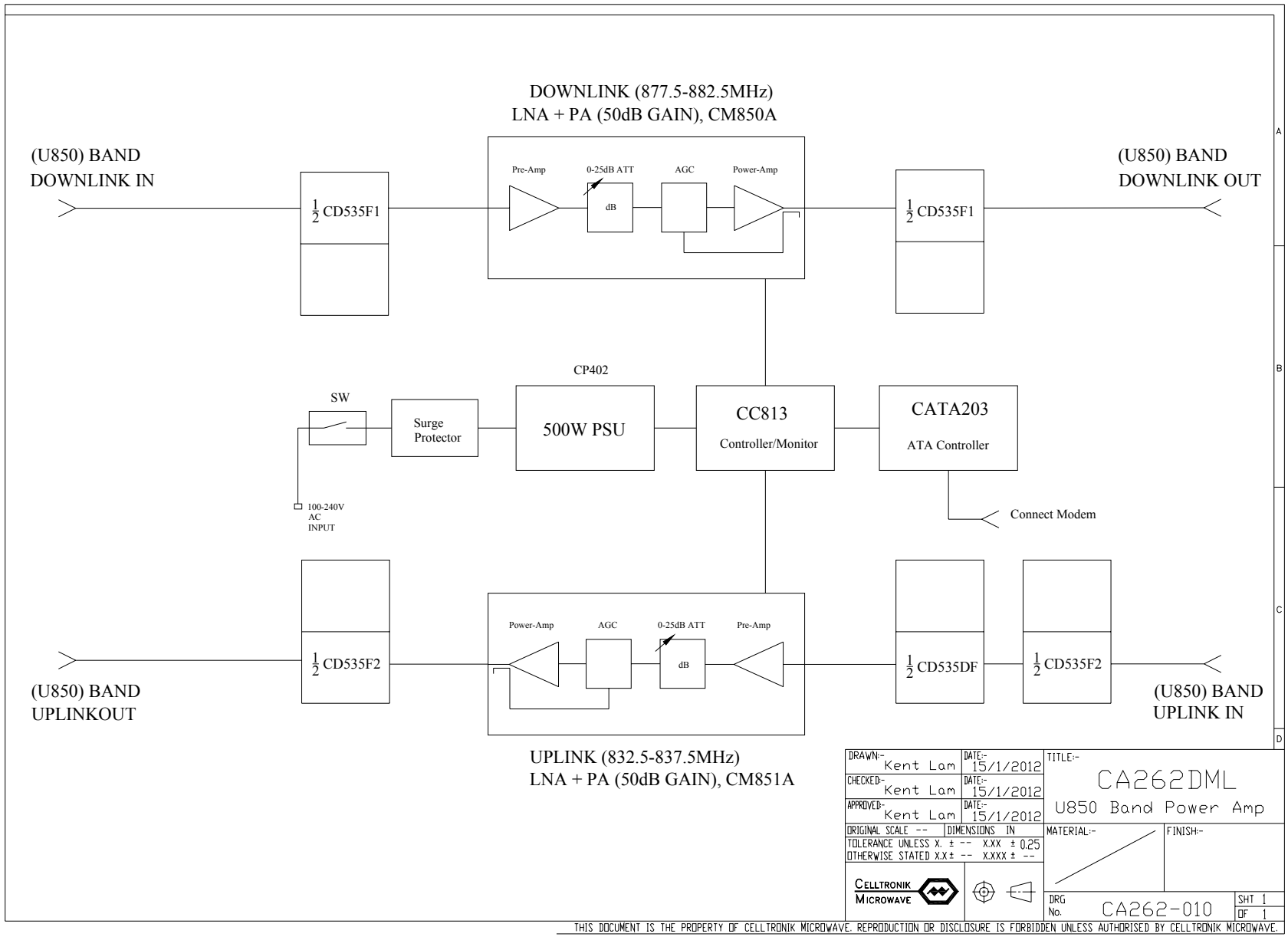

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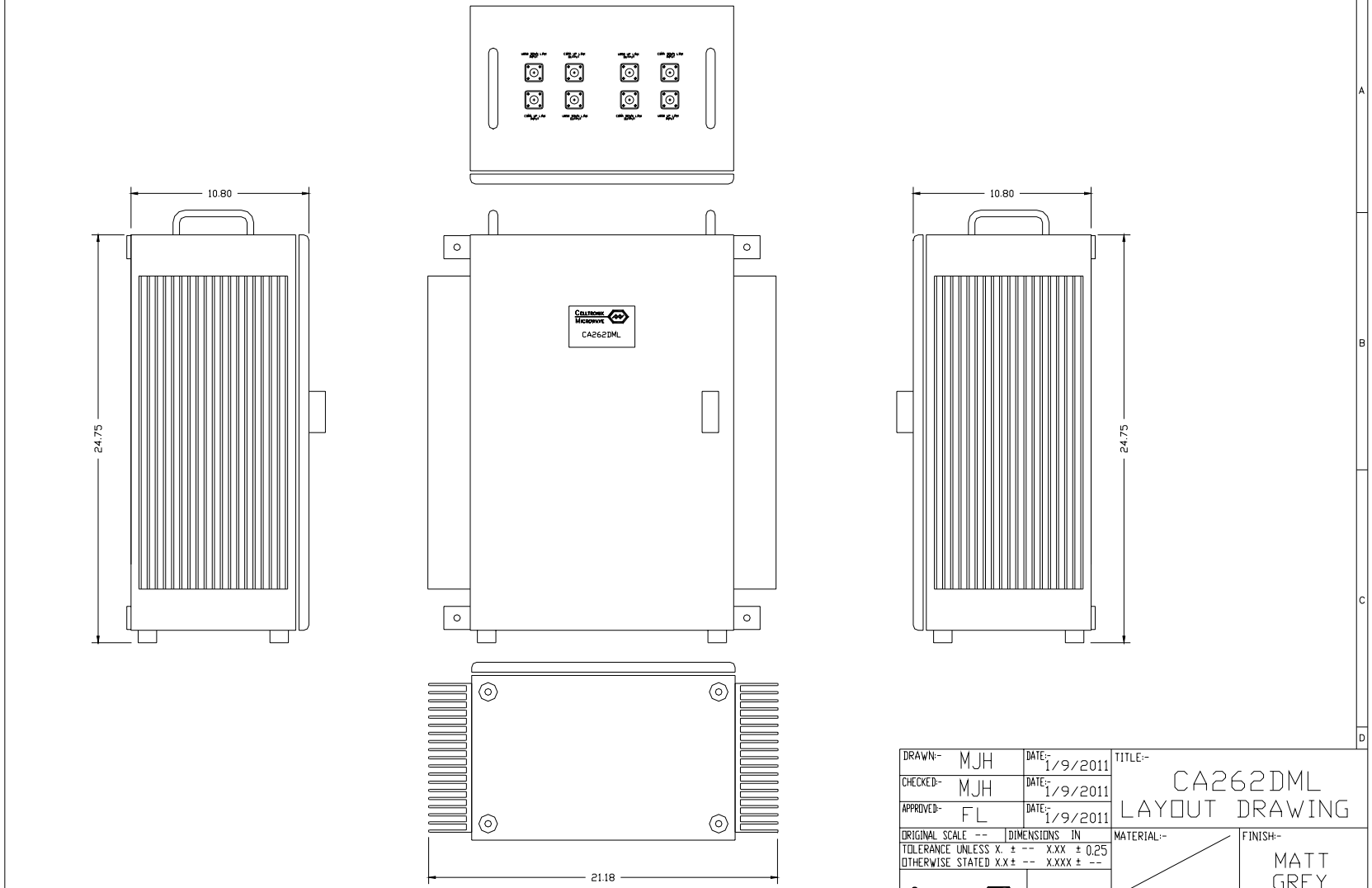


DRAWN:- MJH	DATE:- 1/9/2011	TITLE:- CA262DML LAYOUT DRAWING	
CHECKED:- MJH	DATE:- 1/9/2011		
APPROVED:- FL	DATE:- 1/9/2011		
ORIGINAL SCALE --	DIMENSIONS IN	MATERIAL:-	FINISH:- MATT GREY
TOLERANCE UNLESS X. ± -- OTHERWISE STATED X.X ± --	X.XX ± 0.25 X.XXX ± --		
CELLTRONIK MICROWAVE		DRG No. CA262012	SHT 1 OF 1

5 SUB-UNIT MODULES

5.1 Dual Band Pass Filter

5.1.1 Description

These Dual Band Pass Filter are multi-section designs with a bandwidth dependent upon the passband frequencies, (both tuned to customer requirements). The response shape is basically Chebyshev with a passband design ripple of 0.1dB. The filters are of combine design and are carefully aligned during manufacture in order to optimize the insertion loss, VSWR and intermodulation characteristics of the unit. The tuned elements are silver-plated to reduce surface ohmic losses and maintain a good VSWR figure and 50Ω load at the input and output ports.

Being passive devices, the bandpass filters should have an extremely long operational life and require no maintenance. Should a filter be suspect, it is usually most time efficient to replace the module rather than attempt repair or re-tuning.

No adjustments should be attempted without full network sweep analysis facilities to monitor both insertion loss and VSWR simultaneously.

5.1.2 U850 Downlink Dual Band Pass Filter Technical Specification (CD535F2)

Passband:	877.5 – 882.5MHz
Insertion Loss:	< 0.8dB
Return Loss (all ports):	> 20dB
Rejection :	> 80dB +/-25MHz from passband edge

Power handling:		200Watts
Connectors:		N type female
Temperature,	operation:	-20°C to +55°C
	storage:	-40°C to +70°C
Size:		10” x 9.5” x 2.5” (excluding connectors)
Weight:		3kg

5.1.3 U850 Downlink Dual Band Pass Filter Technical Specification (CD535F1)

Passband:		832.5 – 837.5MHz
Insertion Loss:		< 0.8dB
Return Loss (all ports):		> 20dB
Rejection :		> 80dB +/-25MHz from passband edge
Power handling:		200Watts
Connectors:		N type female
Temperature,	operation:	-20°C to +55°C
	storage:	-40°C to +70°C
Size:		10” x 9.5” x 2.5” (excluding connectors)

Weight : 3kg

5.2 Downlink Amplifier

5.2.1 Description

This Downlink band high power amplifiers is a multi-stage solid-state power amplifier. It's pre-amplifier and driver stages are working in Class A condition and the output power stage is a high linearity 260W LDMOS device. This Downlink Amplifier includes digital attenuator, AGC, alarm and monitoring circuit. All the semi-conductor devices are very conservatively rated to ensure low device junction temperatures and a long, trouble free working lifetime.

This power amplifier unit should require no maintenance over its operating life. Under no circumstances should the cover be moved 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.

5.3 Uplink Amplifier

5.3.1 Description

Theis Uplink band power amplifiers is a multi-stage solid-state power amplifier. It's pre-amplifier and driver stages are working in Class A condition and the output power stage is a high linearity 30W LDMOS device. This Uplink Amplifier includes digital attenuator, AGC, alarm and

monitoring circuit. All the semi-conductor devices are very conservatively rated to ensure low device junction temperatures and a long, trouble free working lifetime.

This power amplifier unit should require no maintenance over its operating life. Under no circumstances should the cover be moved 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.

5.4 28V 500W Switching Power Supply (CP402)

5.4.1 Description

This power supply unit is a switching mode type capable of supplying 28V DC at 20.0 Amps continuously. This High Power Amplifier requires approximately 15 Amps at 28V DC, therefore, this unit will be used conservatively ensuring a long operational lifetime.

No routine maintenance of this power supply unit is required. If a fault is suspected, then the output voltage from the power supply may be measured on its output terminals.

All the Power Supply Units used in Celltronik Amplifiers are capable of operation from either 110 or 220V nominal AC supplies. The line voltage is sensed automatically, so no setting is required from the user.

5.4.2 Technical Specification

AC Input Supply:

Voltage:	90 to 260V
Frequency:	45 to 65Hz

DC Output Supply:

Voltage: 28 V DC (factory set)

22.5 to 30V DC (absolute limits)

Current: 20A

5.5 Controller/Monitor Board (CC813)

5.5.1 Features

The Amplifier Microprocessor controller is a full-featured system tool that allows installers and technicians the ability to set and check all system parameters of the Repeater at the time of installation or during a regular or emergency service call.

Digital Gain Control

Allows up to 25dB adjustment in 1dB increments.

Intelligent Controller

MCU based Controller with easy to see LCD display. The gain and AGC setting can be set locally as well as remote access capability.

Thermal Management Control

Temperature shutdown will occur if over-heat threshold is exceeded. Control will then restore power when temperature returns to normal condition.

Overpower Monitoring

The over-power condition will be monitored. The alarm LED will be lit up on the control panel if over-power occur.

AGC (Automatic Gain Control)

User can activate AGC-LED's will be 'on' when AGC is activated.

DGC (Digital Gain Control)

User can define and set DGC gain levels for precise and consistent control.

Easy Maintenance

The Repeater Microprocessor Control stores all settings in non-volatile memory. Modules can be filed-changed without the requirement of system realignment. All modules are plug-and-play to provide minimum delay in system servicing.

6 System Design and Installation

6.1 Natures of Coverage Design by Repeater

The application of repeater or amplifier is used to provide the coverage for :

- Infrastructure Tunnels, Airports, Highway & subways
- Large Shopping Mall / Plaza
- Basement car parks
- Intelligent & higher commercial towers

Coverage:

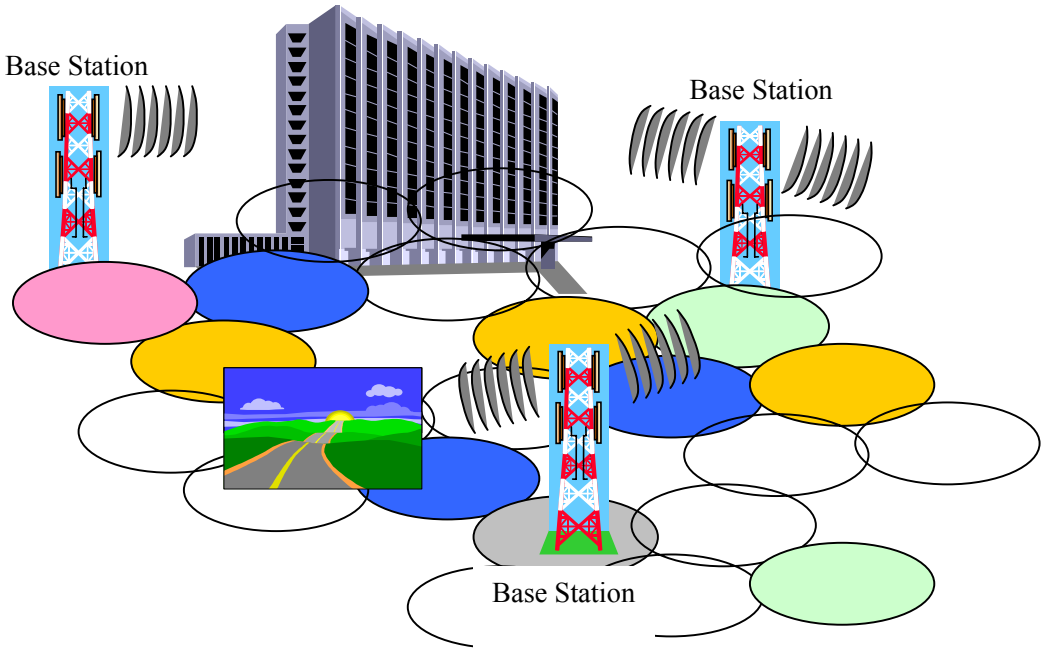
Mobile telephones are increasingly being used indoors in places such as shopping mall, sports facilities, parking garages, museums, trains, stations, airports and office towers. These indoor environments give rise to challenges in terms of capacity and coverage.

These challenges are accentuated with increased amounts of data transfer. Internet usage via Wireless Access Protocols is a first step in this development.

Focus on:

- No radio wave and weak radio wave areas
- Radio link interference
- Congested locations

Signal quality will obviously be a key issue in obtaining profitable networks with high grade of service and low churn rate.



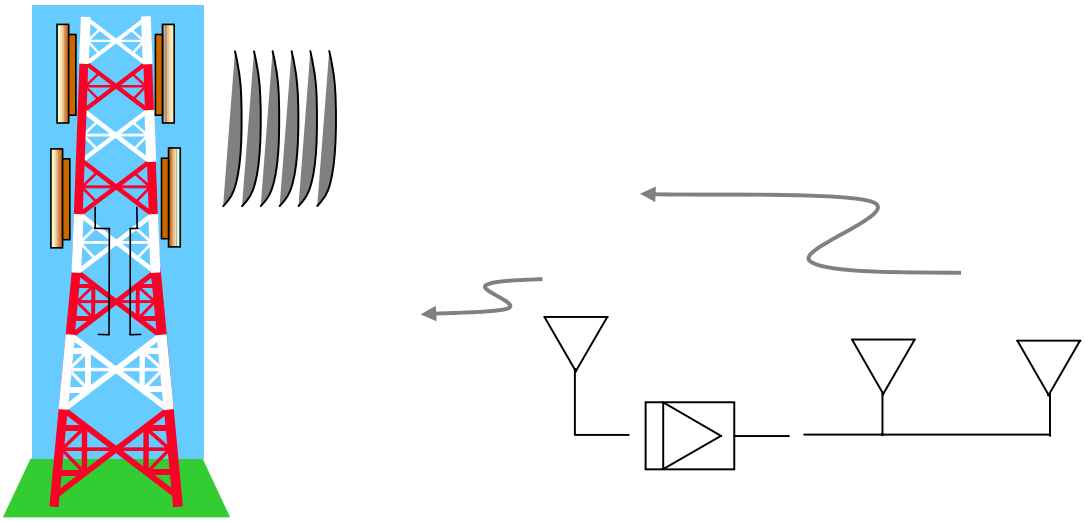
6.2 Antenna Installation & Gain Calculations

1 In order to provide a indoor (enclosed) coverage, most of repeaters or amplifier (duplex / simplex) should be at least required two antennas, one is a panel antenna towards the donor cell base station for receiving donor signal from outdoor, and the other is some kinds of radiating equipment, such as a leaky cable, omni-directional antenna or Yagi to cover the area in which the mobiles are to be served.

2 The maximum gain at which the repeaters or amplifiers can be set is limited by the figure of system isolation that can be obtained between these two antennas, one is donor and other is radiator. As to provide the optimized repeating system, RF signal with certain level need to be injected to one of the radiated antennas and then measure the signal level received by the donor antenna by use of spectrum analyzer. The isolation can then be calculated as the difference

between these two figures. The gain in each path of the repeater or amplifier should be set at least 13 dB below this figure, using attenuators as described below in attachment.

Antenna Isolation Measurement



Base Station Tower

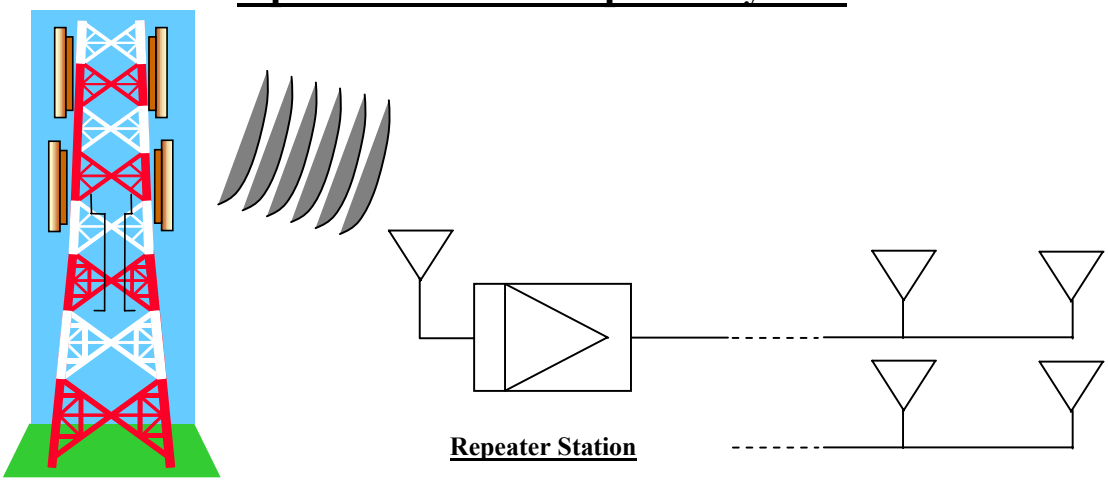
3 In order not to overload the amplifier, it is recommended that the input level (Donor signal) at the amplifier (base port) should be less than –50dBm. This figure is assuming maximum gain, and may be increased by the value of the additional attenuator fitted in the downlink path. The gain of the amplifier downlink path should be set such the donor site will not overload the amplifiers, otherwise, the AGC control will be effective to lower down the gain setting.

4 The amplifier gain is set by adjusting the digital attenuators in each RF path via RS232 micro controller (remote dial-up or local connect) to control the downlink and uplink gain values between the two amplifiers. Note that the uplink (mobile to base) and downlink (base to mobile) path gains are set independently. This allows the paths to have different gains if required to set the correct output power levels. And also, high temperature alarm will be activated once the working environment is not fitted the operating temperature of the amplifier.

5 It is recommended that the gains are set such that the Downlink channel output level from the amplifier are typically +33dBm per UMTS channel even though the full UMTS output power with loading is +40dBm per channel. (Input level + Gain = Output level)

6 For the Simplex version, the isolation of the input-output cable must be measured and then perform the same procedure as that of the Duplex version.

Optimized Indoor repeater system



6.3 Automatic Gain Control (AGC)

The function of Automatic Gain Control (AGC) is used to keep the output signal power of the Amplifier not exceed the predefined level (Maximum Output Power) as the input signal amplitude varies. The ACG range of CA262DML is 25dB, the power of the input signal for both uplink and downlink Amplifier should not be greater than -8dBm in order to avoid saturating the pre-amplifier stages.

To use the AGC function, it is recommended to use the 'Maximum Gain Setting' of the Amplifier if the 'Maximum Gain Setting' is at least 10dB below the figure of the 'Isolation between Base Port Antenna and Mobile Port Antenna'.

6.4 Modem Initialisation

Connect a external modem to the Modem Port of the CC813 Controller/Monitor of the Amplifier. Please note that the power of the external modem should be switch on with the Amplifier simultaneously because the CC801 of the Amplifier will send a series of commands to the modem for initialisation. But in case of the modem maintenance (e.g. the modem must be switch off and then switch on again), there is a method to initialize the modem without switch off /on the Amplifier to avoid the interruption of the service. By pressing and hold the '▲' button for 2 seconds, the CC813 Controller will send a series commands to the modem for initialisation.

7 MAINTENANCE

7.1 General Comments

7.1.1 Procedures

In the event that the performance of the system is suspect, a methodical and logical approach to the problem will reveal the cause of the difficulty. The system consists of modules within a wall mounted, environmentally protected enclosure

Transmissions from the donor site are passed though the system to the mobile radio equipment; this could be a handheld radio or a transceiver in a vehicle. This path is referred to as the Downlink. The return signal path from the mobile radio equipment to the base station is referred to as the Uplink.

The first operation is to check the alarms of each of the active units and determine that the power supplies to the equipment are connected and active and the green LED on the front door of the case should be illuminated. Amplifier alarm conditions are individually visible on the CC801roller/Monitor board, a '0' indicating 'good' and a '1' indicating an alarm condition. (0 = LED "OFF", 1 = LED "ON")

If an alarm condition is found, then that individual module must be removed and individually tested against the original test specification. The individual amplifier modules in the Amplifier green LED showing through their case lids, which is illuminated when the unit is working correctly.

If an amplifier is suspect, check the DC power supply to the unit. The Power Amplifier should have +28 DC input supply. If no other fault is apparent use a spectrum analyzer to measure the incoming signal level at the input and then after reconnecting the amplifier input, measure the output level. Consult with the system diagram to determine the expected gain and compare results.

In the event that there are no alarms on and all units appear to be functioning it will be necessary to test the system in a systematic manner to confirm correct operation.

7.1.2 Downlink

Confirm that there is a signal at the expected frequency and strength from the base station. If this is not present then the fault may lay outside the system. To confirm this, inject a downlink frequency signal from a known source into the base antenna port of the Amplifier and check for output at the Mobile antenna port.

If the expected signal is not found at the output, it will be necessary to follow the downlink path through the system to find a point at which the signal is lost. The expected downlink output for the given input can be found in the end-to-end test specification. Refer to section 4 for the system diagram from which the expected gain stages can be found.

7.1.3 Uplink

Testing the uplink involves a similar procedure to the downlink except that the frequencies used are those transmitted by the mobile equipment.

7.1.4 Fault repair

Once a faulty component has been identified, a decision must be made on the appropriate course to carry out a repair. A competent engineer can quickly remedy typical faults such as faulty connections or cables. The exceptions to this are cable assemblies connecting bandpass filter assemblies that are manufactured to critical lengths to maintain a 50-ohm system. Care should be taken when replacing cables or connectors to ensure that items are of the correct specification. The repair of component modules such as amplifiers and bandpass filters will not usually be possible in the field, as they frequently require specialist knowledge and test equipment to ensure correct operation. It is recommended that items of this type are replaced with a matched spare unit and the faulty unit returned to Celltronik for repair.

7.1.5 Checking service

Following the repair of any part of the system it is recommended that a full end-to-end test is carried out in accordance with the test specification and that the coverage is checked by survey.
It is important to bear in mind that the system includes a radiating cable network and base stations that may be faulty or may have been damaged.

7.1.6 Service Support

Advice and assistance with maintaining and servicing this system are available by contacting **Celltronik Microwave**

7.2 Tools & Test Equipment

The minimum tools and test equipment needed to successfully service this AFL product are as follows:-

Spectrum analyzer:	up to 3GHz (Dynamic range = 90dB).
Signal Generator:	up to 3GHz (-120dBm to 0dBm o/p level).
Attenuator:	20dB, 10W, DC-3GHz, (N male – N female).
Test Antenna:	Yagi or dipole for operating frequency.
Digital multi-meter:	Universal Volt-Ohm-Amp meter.
Test cable x 2:	N male – N male, 2M long RG214.
Test cable x 2:	SMA male – N male, 1m long RG223.
Hand tools:	Philips #1&2 tip screwdriver.
	3mm flat bladed screwdriver.
	SMA spanner and torque setter.

7.3 Care of Modules

Note: Tighten SMA RF connectors using only a dedicated SMA torque spanner. If SMA connectors are over-tightened, irreparable damage will occur. . Do not use adjustable pliers to loosen/tighten SMA connectors.

Also take care not to drop or knock the module as this can damage (or misalign in the case of tuned passive modules) sensitive internal components. Always store the modules in an environmentally friendly location

7.3.1 General Comments

Many of the active modules contain semiconductor devices utilizing MOS technology, which can be damaged by electrostatic discharge. Correct handling of such modules is mandatory to ensure their long-term reliability.

To prevent damage to a module, it must be withdrawn/inserted with care. The module may have connectors on its underside, which might not be visible to the service operative.

7.3.2 Module Removal (PA)

The following general rules should be followed to remove an amplifier module:

1 Switch Cell Enhancer off.
2 Remove all connectors (2 x RF SMA, 1 x 9pin 'D' socket)
3 Release module retaining fixings.
4 Slowly but firmly, pull the module straight out of its position. Take care not to twist/turn the module during withdrawal.

7.3.3 Module Replacement

1 Carefully align the module into its location then slowly push the module directly straight into its position, taking care not to twist/turn it during insertion.

2 Reconnect all connectors.

3 Replace retaining fixings.

4 Double-check all connections before applying power.

7.3.4 Power Amplifier Removal

1) Switch Amplifier

2) Remove all connectors (2 x RF SMA, 2x 9'D' socket).

3) The Power Amplifier is fixed to a heatsink mounted in the side of the case. To remove the PA from the heatsink, unscrew the 8x #8-32 screws located on the PA will most likely remain in place with the screws removed due to the heatsink compound used but should be removable by firmly pulling the module away from its position.

7.3.5 Power Amplifier Replacement

1) The new Power Amplifier module should have adequate heatsink compound spread over its heatsink mating face before aligning into its location.

2) Tighten the 8 x #8-32 fixing screws to fasten the new PA in position.

3) Reconnect all connectors.

4) Double-check all connections before applying power.

7.3.6 AC Power Supply Unit Removal

1) Disconnect the AC power supply cable to the Cell Enhancer.

2) Unscrew the 4 x M3 screws holding the PSU to the bottom of the enclosure.

3) Disconnect the 3 AC input wires from the PSU input connector block.

4) Loosen the DC output terminal nuts and remove the 3 DC output cables.

5) Remove the PSU from its position.

7.3.7 AC Power Supply Unit Replacement

1) Ensure that the Amplifier does not have the AC power supply cable connected.
2) Fix the 3 DC output cables to the new PSU DC output terminals.
3) Connect the 3 AC input wires to the PSU input connector block.
4) Screw in the M3 screws to fix the PSU to the bottom of the enclosure, tighten to firm hand pressure.

8 Operating Procedure of CA262DML

8.1 Step One

Make sure the switch of the amplifier is at the "OFF" position.

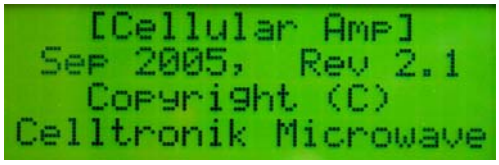
Connect the waterproof power supply cable as follows:

- Black - Live
- White – Neutral
- Green – Ground / Earth

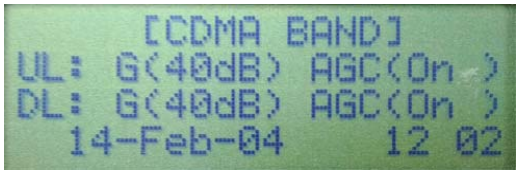
8.2 Step Two

Turn the power switch to: ON

The screen will show a greeting display for a few seconds:

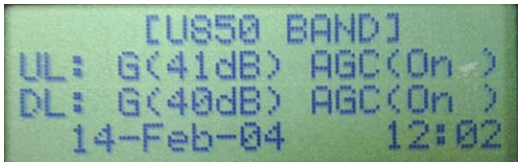


As the greeting display disappears, the following will be shown:



8.3 Step Three

There are two bands available in the system: CDMA and U850. To select the band, simply press the ▼ button or the ▲ button.



Both the Up Link Gain and the Down Link Gain are adjustable between 40 dB to 65 dB for each band. The AGC can also be set on or off individually.

To adjust the "Up Link Gain":

- Press the "Set" button until the Up Link (U/L) Gain setting flashes;
    - Reduce the gain by pressing the ▼ button;
    - Increase the gain by pressing the ▲ button.

- To adjust the "Down Link Gain":
    - Press the Set button until Down Link (D/L) Gain setting flashes;
    - Reduce the gain by pressing the ▼ button;
    - Increase the gain by pressing the ▲ button.

The Up Link AGC and Down Link AGC (DnAGC) can be turned on by pressing the Set button until the word OFF flashes, then press the ▲ or the ▼ button. Repeat the procedure if you wish to turn them off.

When the adjustment is done, you can get out of the modifying mode by pressing the Set button until nothing in the screen flashes or simply wait a few seconds.

8.4 Step Four

Close the door and make sure the Status LED light is green. If the signal light is red, that means there is a problem somewhere and the internal Alarm LED will show where the problem is.

8.5 Alarm

There are two columns of LEDs next to the screen. The column on the left is connected to Down Link and the one on the right is connected to Up Link. When there is a problem in the band appeared on the screen, the indicator would light up to indicate where the problem occurs.
To verify the problems for each band,:
- Press on ▼ button or the ▲ button until the band desired;

Then the lights will light up if there are problems with this particular band.

8.6 Assigning address

Each amplifier should have its own address. This will facilitate the remote operation. To assign an address:

- Press and hold on the “Set” button until the following screen appears:

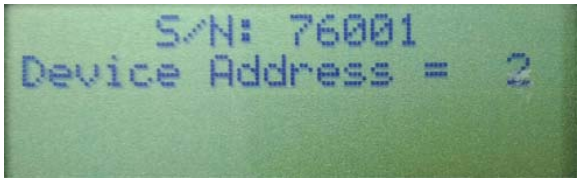


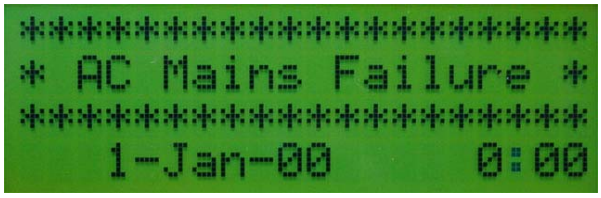
Figure 1

- Then press the ▼ button or the ▲ button to chose the address that you want to assign. You have up to 32 addresses to choose from.

To return to the main screen, press the "Set" button again or simply wait a few seconds.

8.7 AC Mains Failure

In case of AC Mains Failure, the Amplifier will report this alarm to the Report Centre immediately. Simultaneously, the Amplifier's Controller display will show :



9 Operation instruction of remote software (Remote Amp)

9.1 System Requirement

- Pentium III or above PC (500MHz or above)
- COM port (For communication by COM Port) or Modem card (For communication by dialing-up)
- Windows 95/98/2000/Me/XP or above

9.2 General

RemoteAmp is communication software to control and monitor status of remote amplifiers. The main feature includes:

- Change operator password (Preset = 12345678)
- Control AGC and gain setting
- Monitor Amplifier, over power, High temperature, VSWR, DL Low Power, AGC Triggering etc
- Get model, version, serial number information
- Load Report Centre telephone number into the device
- Adjust the clock and date of the device
- Get Alarm History from the device

9.3 Usage

9.3.1 Remote

For the first login, you must use the master password provided by Celltronik. Then you will be able to assign a password to other users.

The following is the main menu of the program:

Figure 1 Main Menu

In this main menu, you will see the remote amplifier icon button , the option icon button , and the close icon button . The Remote icon button will open the "Amp" window. It allows you to set modem port, telephone number of the amplifier and the device address and connect to the device. The Option icon button will allow you to set the phone number of the Report Centre, to which the device reports alarm when problems are detected, the dialling delay and the number of dialling attempts.

Step One:

- Click on "Option";
- Enter the redial delay;
- Enter the number of dialing attempts;
- Enter the telephone number to which you wish the amplifier to report when problems occur;
- Enter the information of your company;
- Click on O.K.

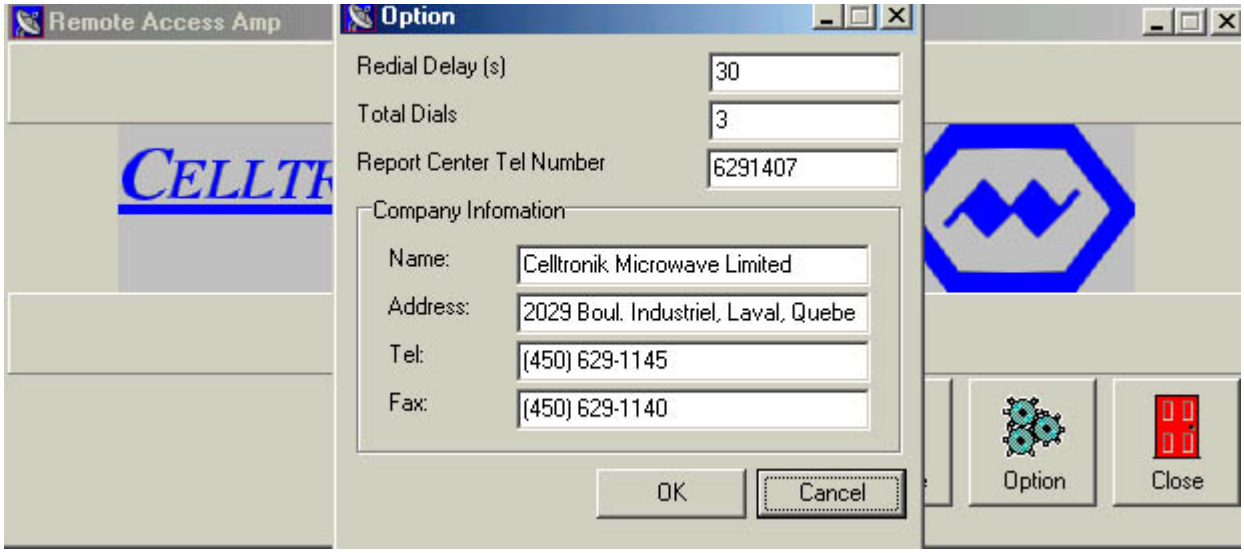


Figure 2

If you do not wish the device to report any problem occurred, enter six zeros as the telephone number:

Figure 3

Step Two:

- Click on the remote icon button, the following will open:

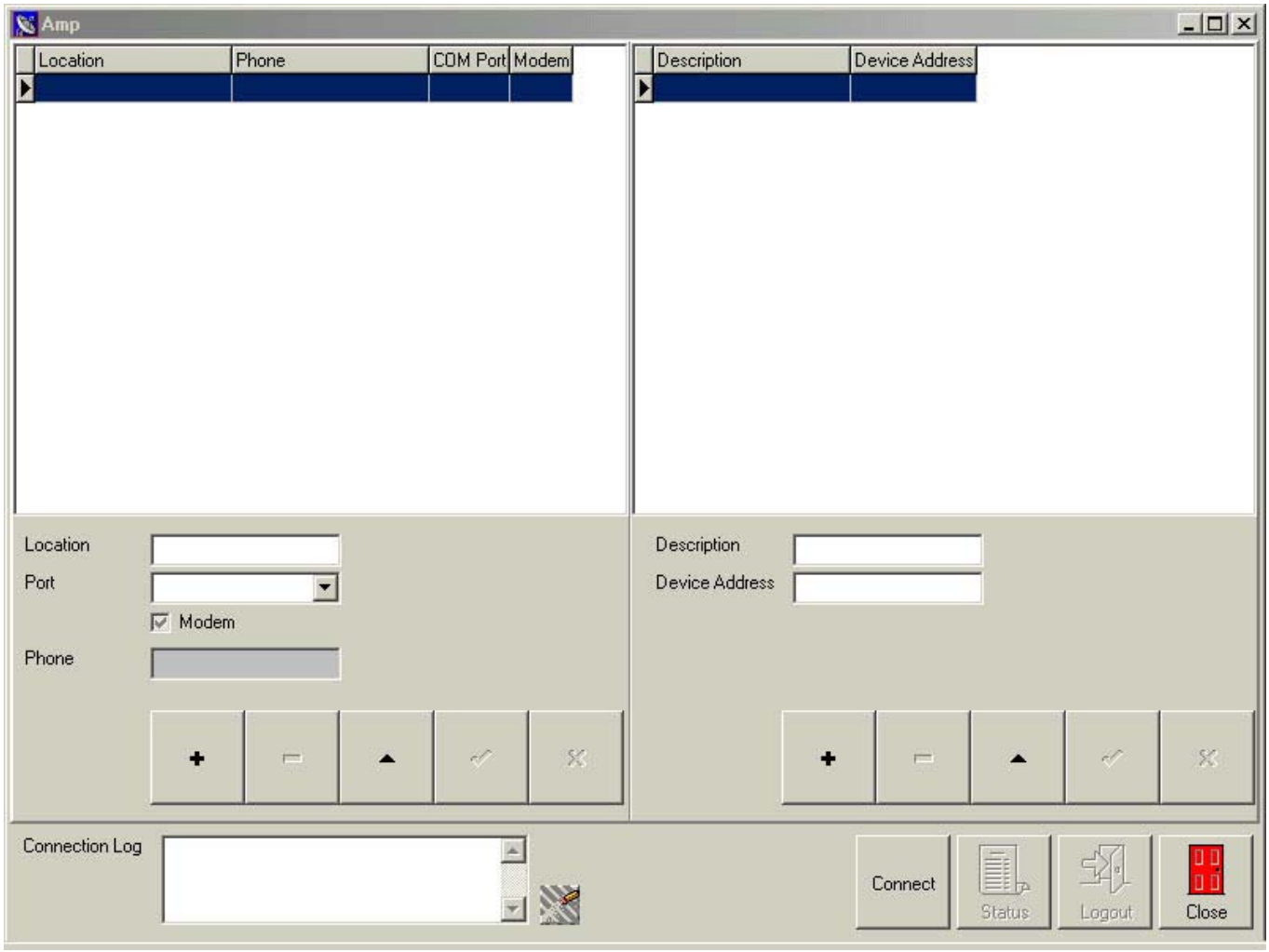


Figure 4

The left window contains the information of the user and his station:

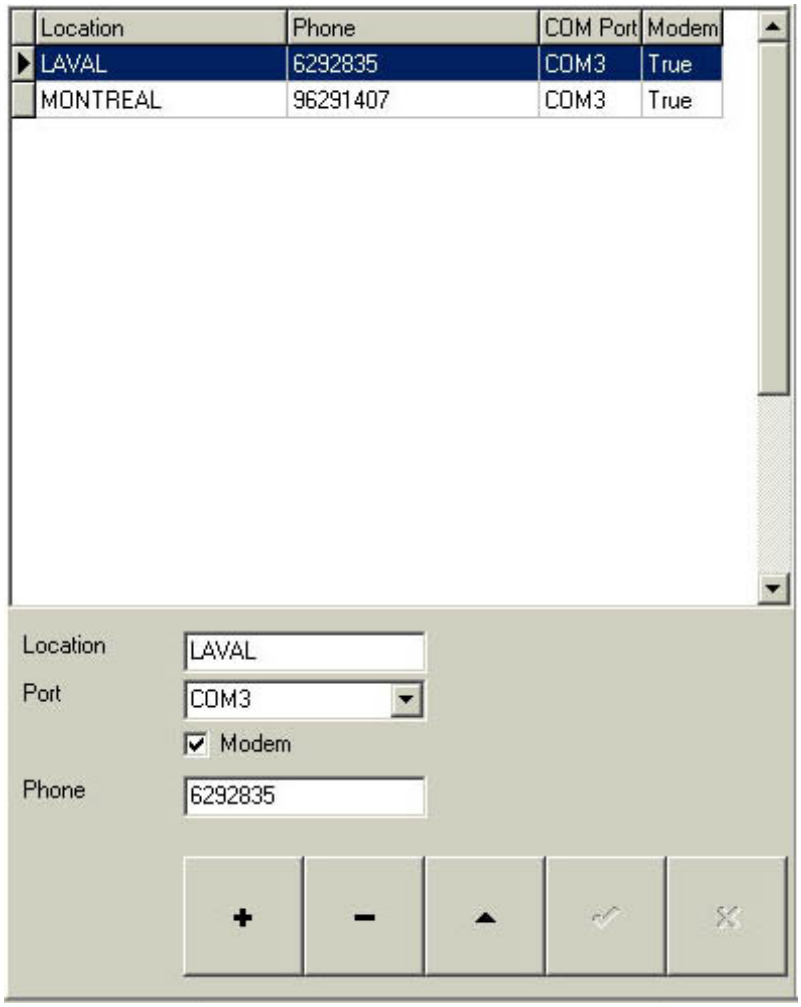


Figure 5

The right window allows you to assign the device or devices to be controlled by each user:

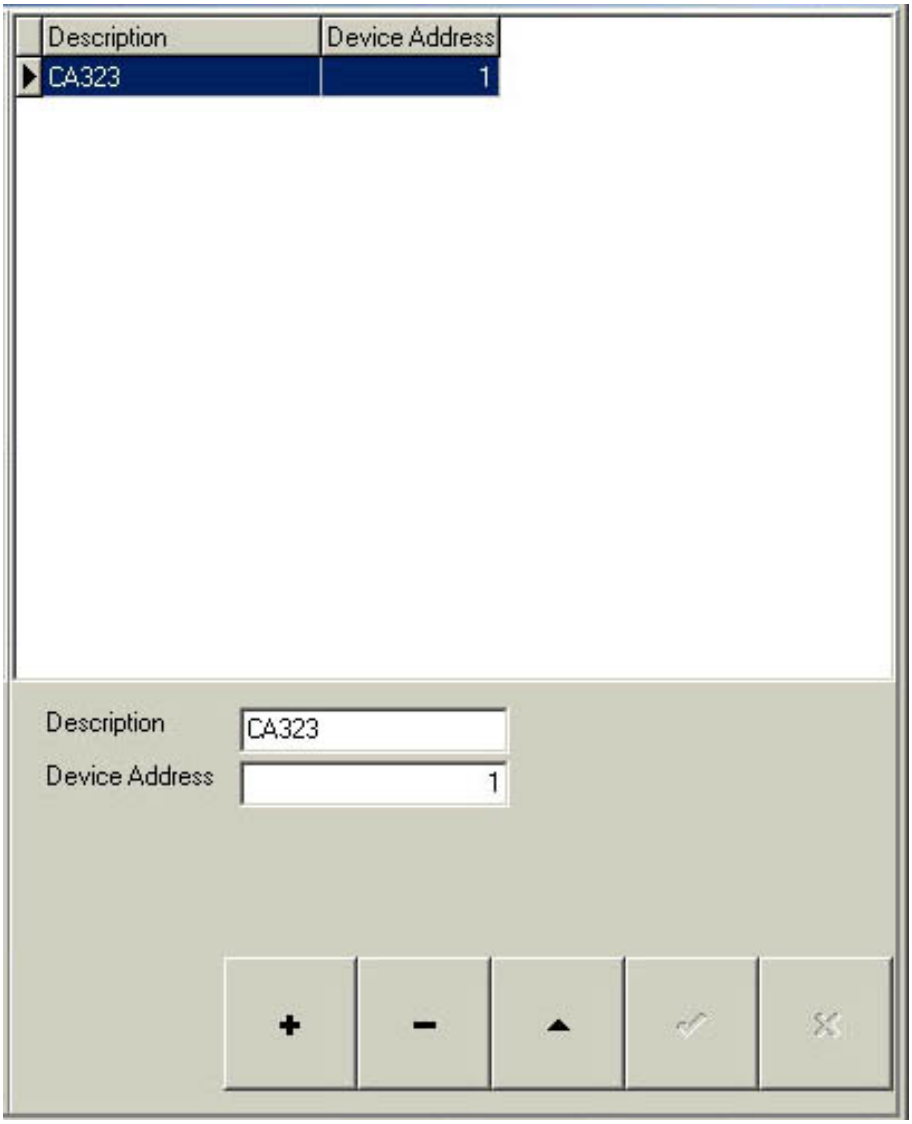


Figure 6

At the bottom of each window, you will see the following bar:

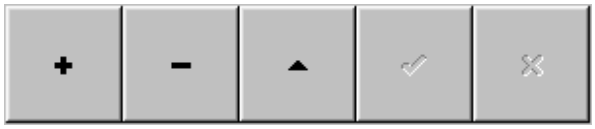


Figure 7

The  icon button is to insert new record. The  icon button is to delete record. The  icon button is to edit record. The  icon button is to apply the modification or to accept the new information.

Step Three:

- Click the  icon button.
- Place your cursor in the blank space at "Location", enter the location where the amplifier will be located:

Figure 8

- At "Port", click on the  button a list of ports will open:

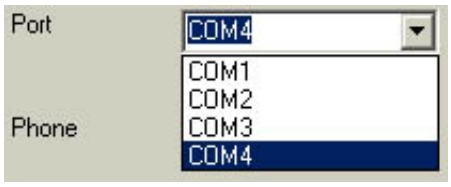


Figure 9

- You must choose a port from this list, because these are the only ones available.
- The modem is automatically activated. If you wish to inactivate it, click on the check mark at "Modem" to remove the latter:

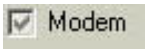


Figure 10

- Place your cursor in the blank space at “Phone”, enter the phone number of the location:

Figure 11

- Click the ✓ icon button to accept the entry.

Once the data is accepted, you can only modify it by clicking the ^ icon button. You may also cancel an entry before it has been accepted by clicking on the × button.

If you wish to delete a location:

- Select the location to be deleted.
- Click on the - icon button.
- The following screen will appear:

Figure 12

- Click “OK” to confirm.

Step Four:

- Select the location;

- Click the + icon button, which will activate the description and device address boxes;
- Place your cursor in the blank space at “Description”, enter the description of the amplifier to be assigned;

Figure 13

- At “Address”, “1” is automatically assigned as the address of the said amplifier. If it is not the right address, erase the “1” and enter the correct address.

Figure 14

- Click the  icon button to confirm.

More than one amplifier can be assigned to the same location by clicking the  icon button, after each one.

When the entry is complete, you should have a window as shown below:

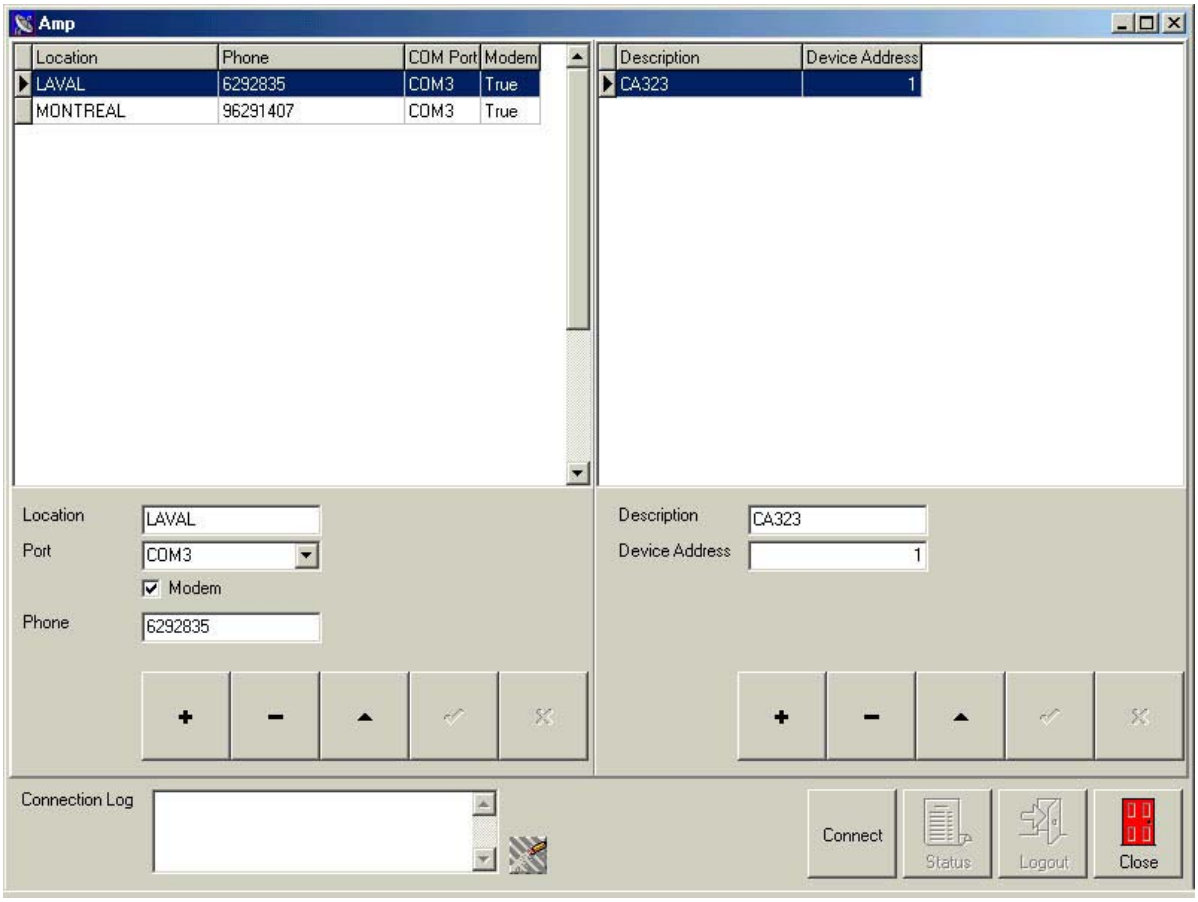


Figure 15

If you wish to remove a amplifier from a location:

- Select that location by clicking on it;
- A list of all the amplifiers assigned will appear;

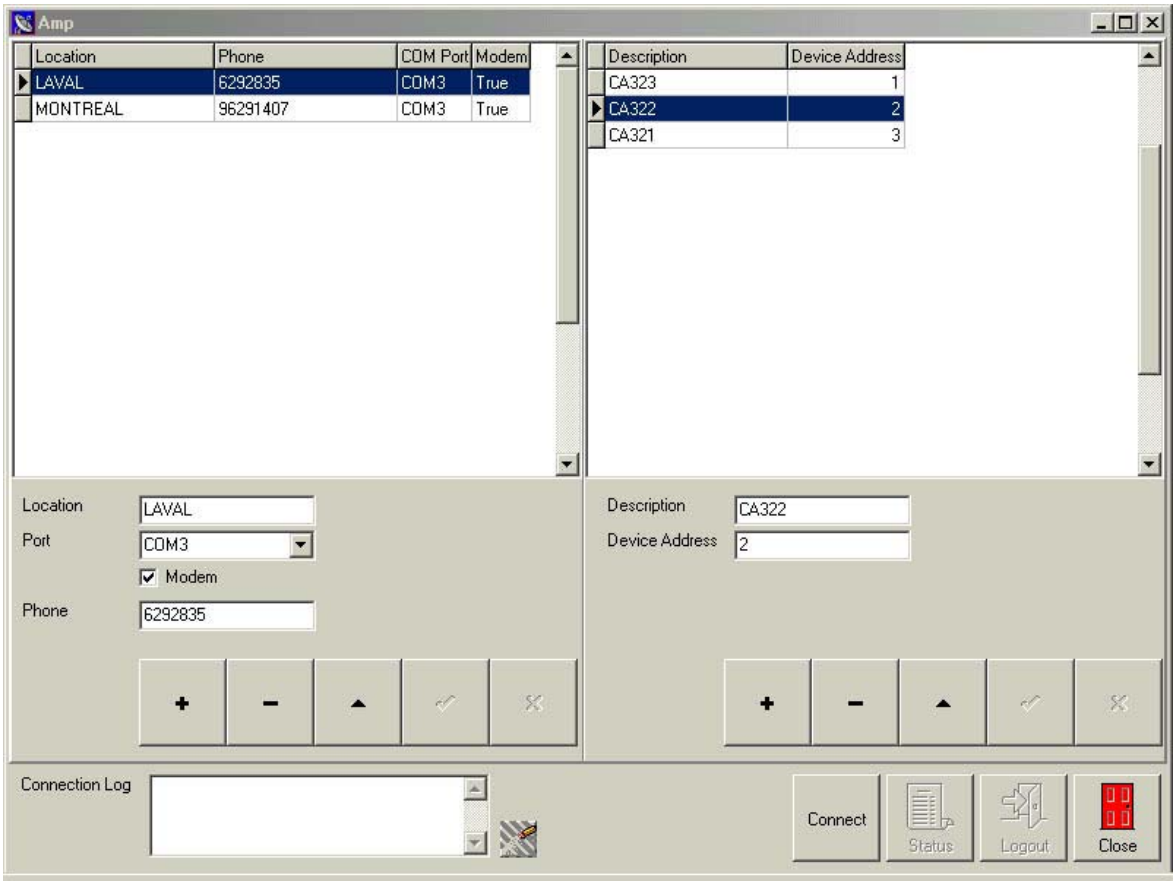


Figure 16

- Select the amplifier to be removed by clicking on it;
- Click the - icon button.
- The following screen will appear:

Figure 17

- Click “OK” to confirm.

Step Five:

- Select the location to which you to connect. (You can only connect to one location at a time.)
- Click on the 

button.

The "Connection Log" located at the bottom left of the window, displays the connection status:

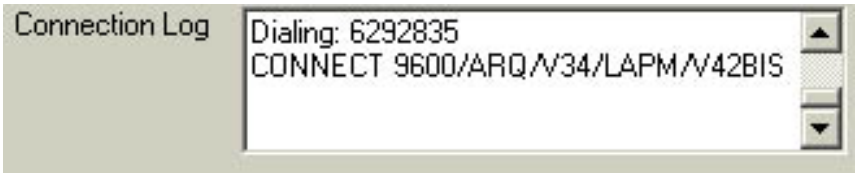


Figure 18

If the device address of the selected amplifier entered in the "Amp" window is not the same as the one set in the said amplifier, or you take too long to enter the password, the following message will appear:

Figure 19

You then have to click OK to get out of the message.

When the control station is connected to the location, the following will appear:

Figure 20

- For first time login, enter the **master password**;
- Click on OK.
- While dialing up, you may click on  to cancel the connection.

Once the password is entered, the Status page will open in a few seconds:

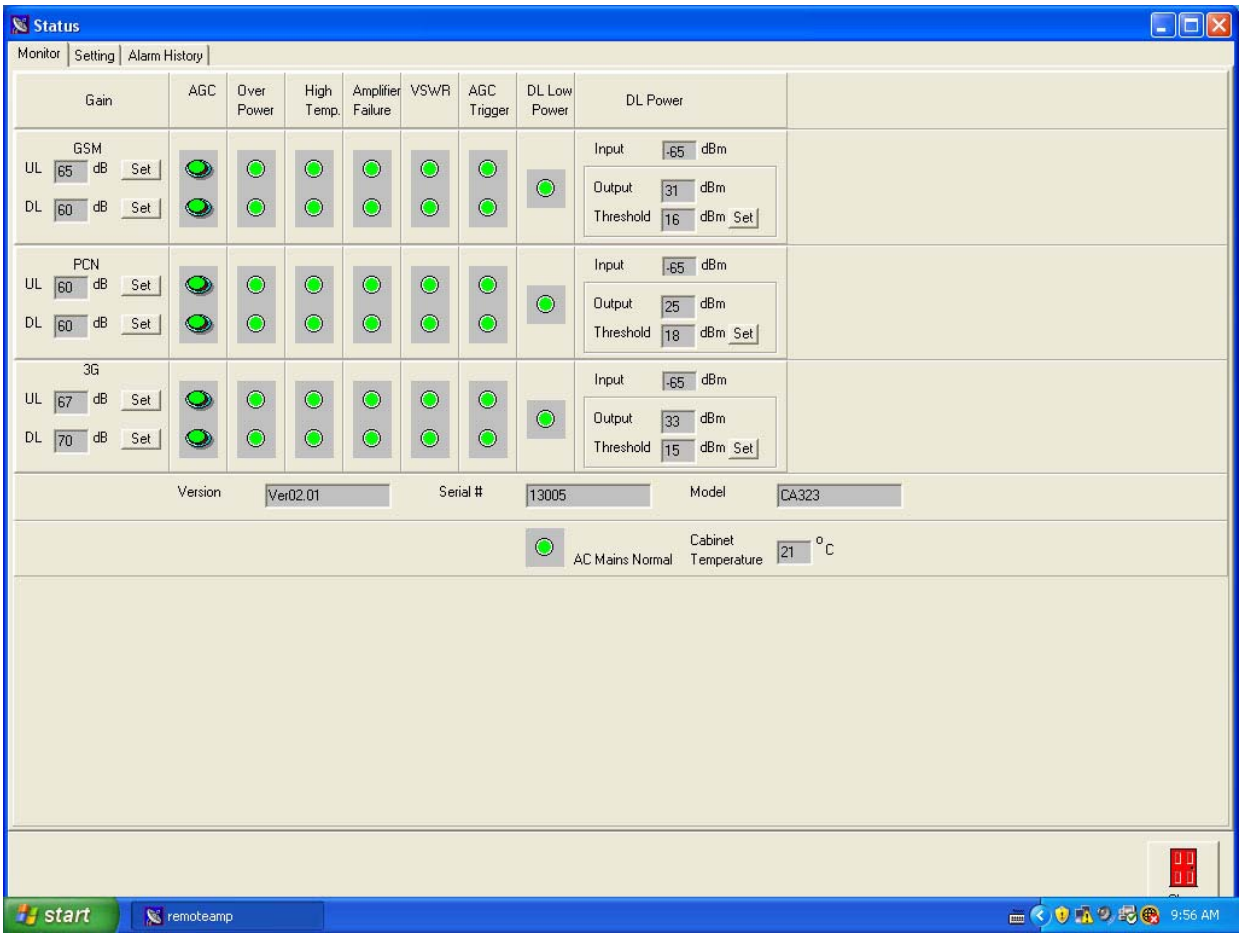


Figure 21

On this page, you will be able to see the status of all the bands activated in the selected amplifier. If you want to check the status of another amplifier, click  button located at the right hand bottom of the page. Select the amplifier desired. Then click on  , the "Status" button and the Status page will open with the information concerning the selected amplifier.

The AGC switches are located in the first column to the left. To activate or inactive the AGC, click on these switches. When activated, the switch turns green. It becomes grey when the AGC is inactivated. Lights on the rights are indicators of problems. Green light represents normal. If a problem or error is detected, a red light in the appropriate column will lit up.

On the right hand side column, it can display the current Downlink input and output power. The Threshold output power can be set by the user from 1dBm to 46dBm for (GSM & PCN) and 1dBm to 40dBm for 3G. Once the output power is lower than this value, a 'Low Power DL Alarm' will be activated.

Step Six:

- Click on "Setting" located on the upper left of the page, the following screen will open:

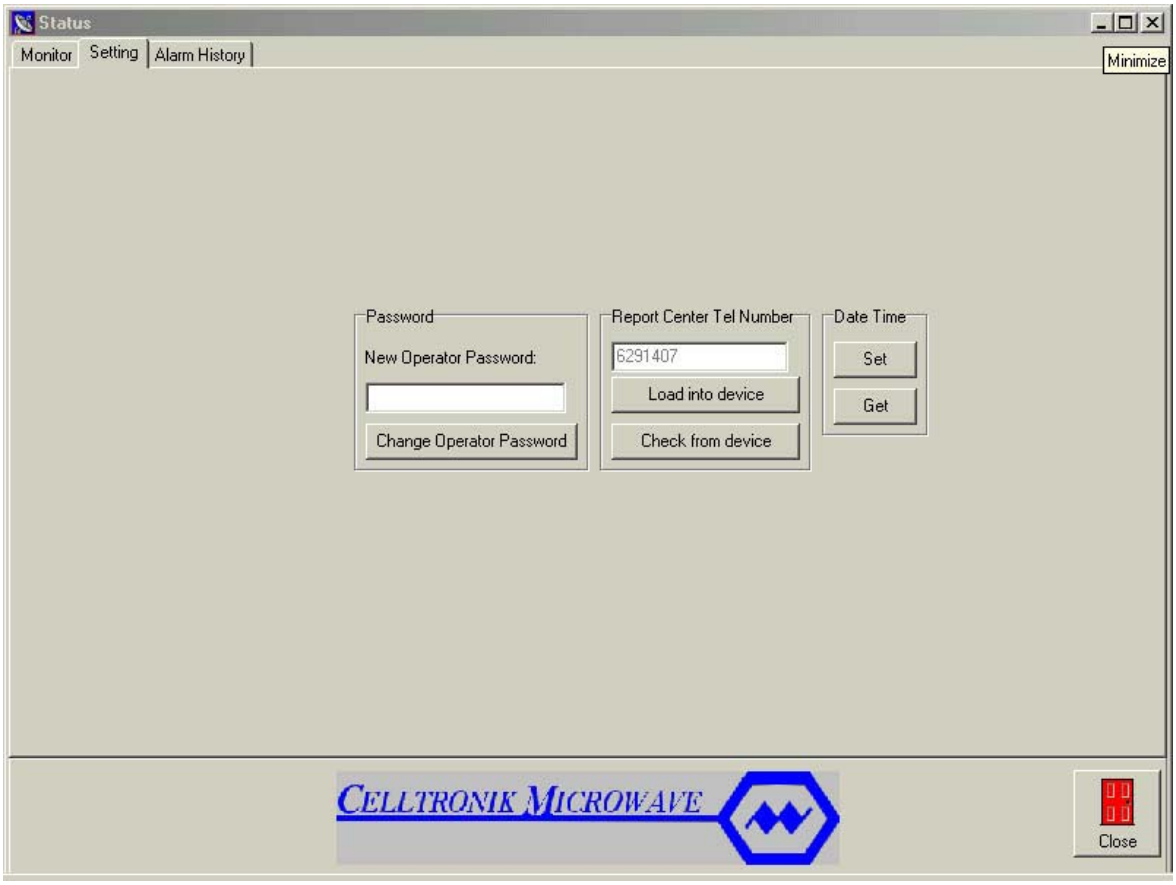


Figure 22

- Enter a new password of eight (8) digits for the operator;
- Click on the “Change Operator Password”, the system will ask you to re-enter the password:

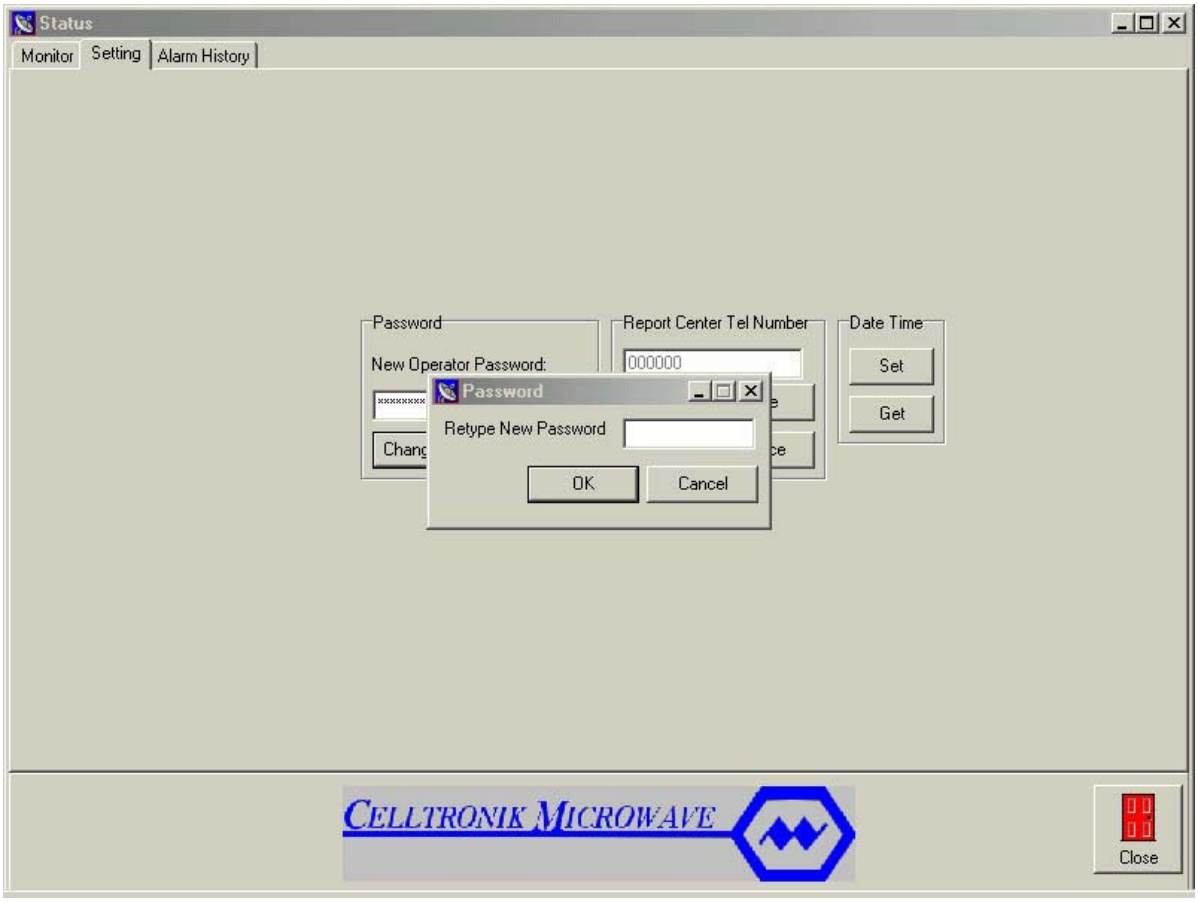


Figure 23

- Re-enter the password, and then click OK.
- When the computer confirms the modification, click OK:

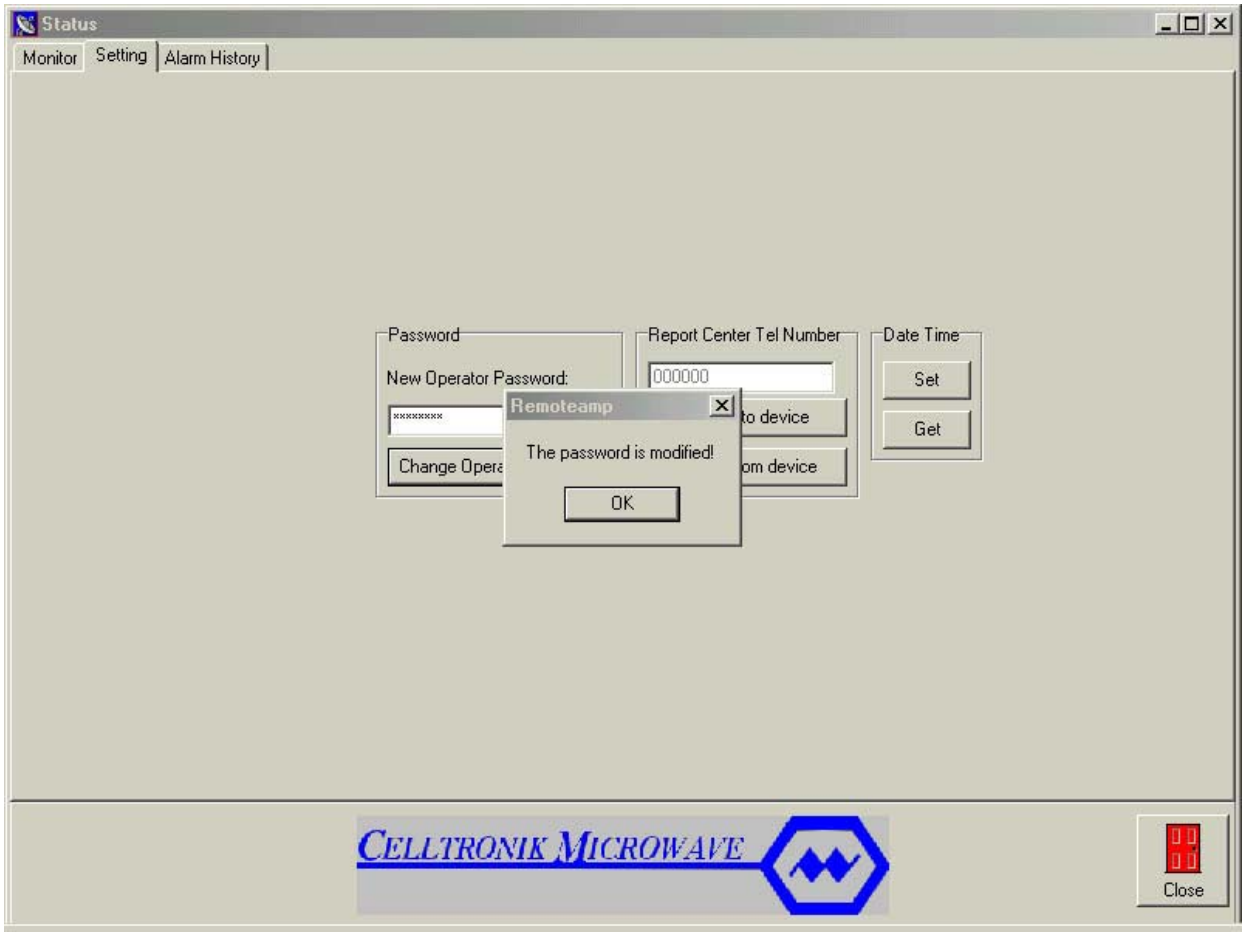


Figure 24

Please note that you are able to change passwords, only if you logged in with the master password.

Step Seven:

- At the "Report Centre Tel Number", the telephone shown is the number entered in the option window in Step One.
- Click on "Check From Device", the number registered in the amplifier will appear:

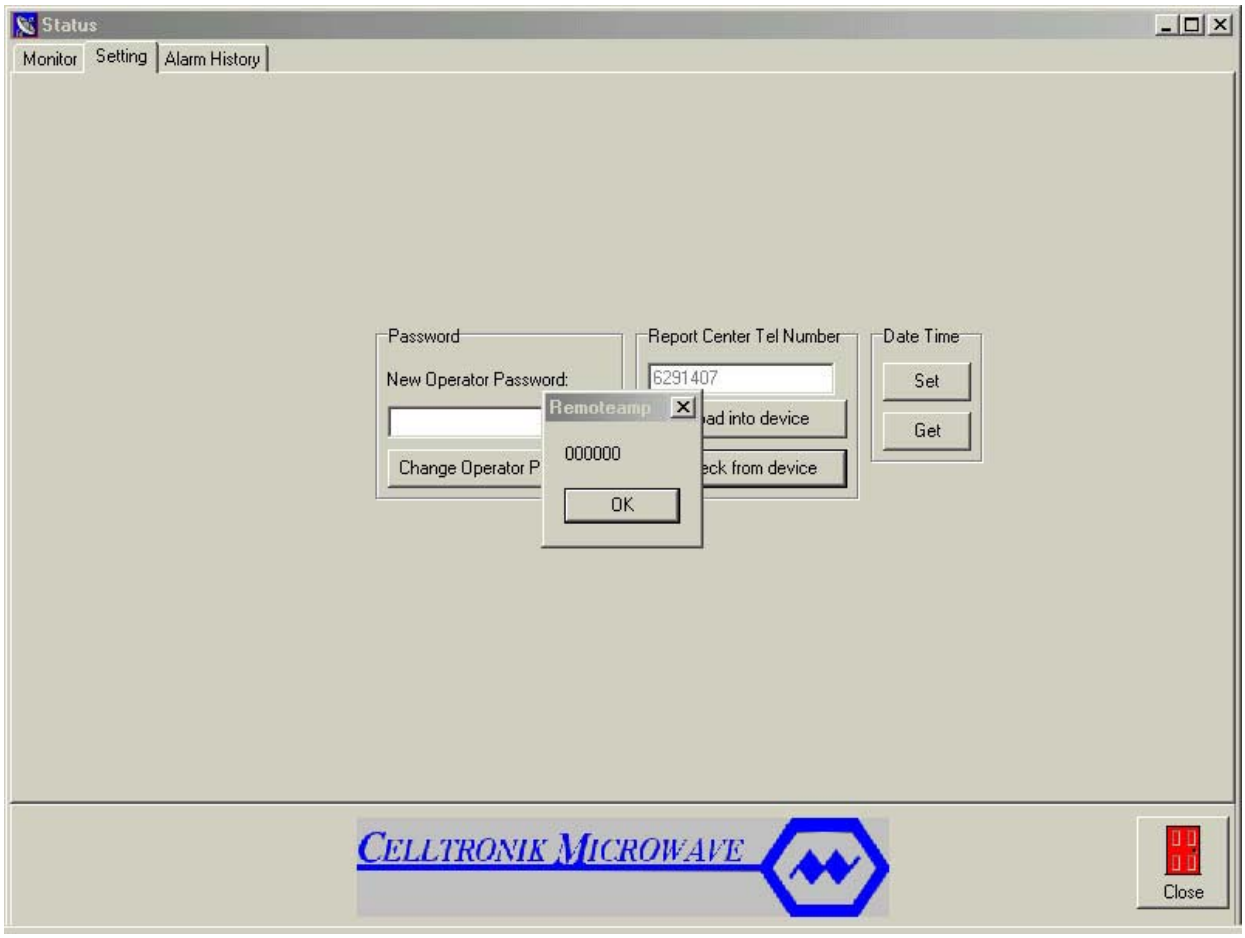


Figure 25

- If the telephone number is different from the one shown at the “Report Centre Tel Number”, click on OK, the click on “Load into device” to register the new number.

- To verify if the modification has been done, click on “Check from device” again, and you will see the new number registered:

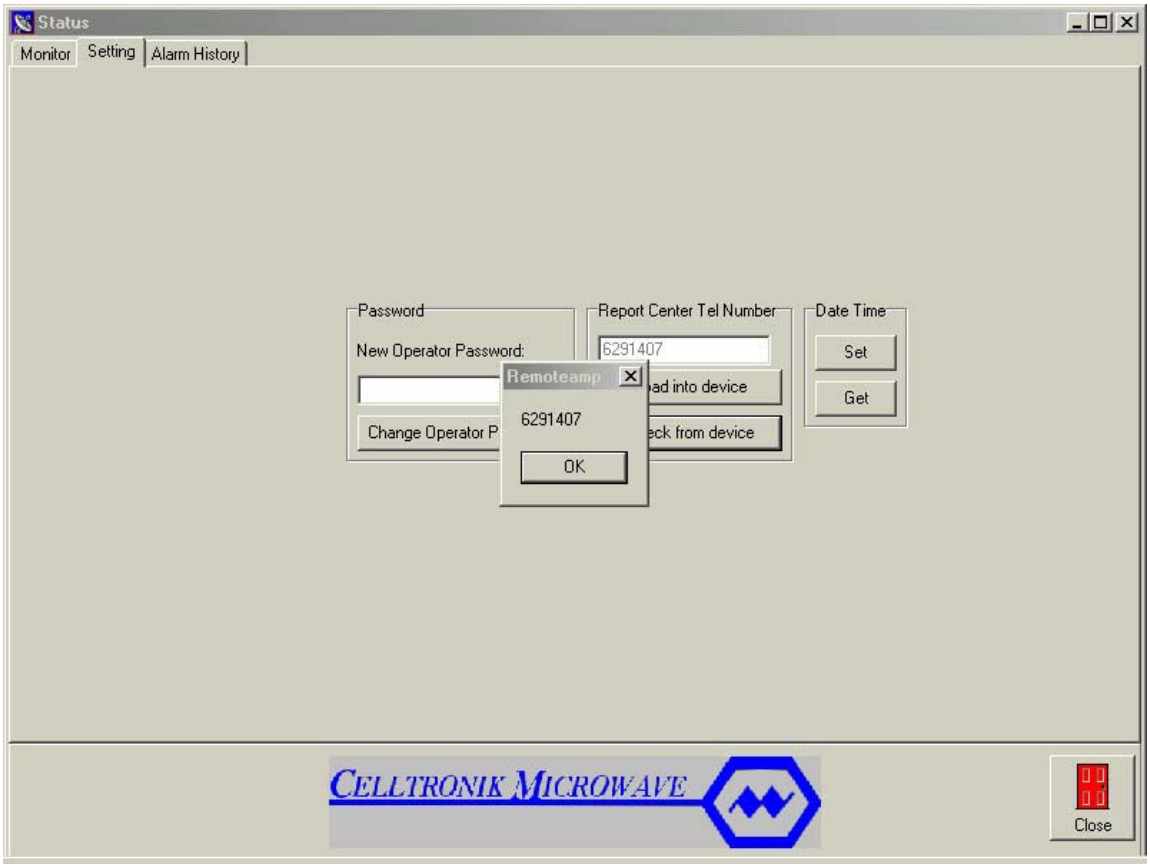


Figure 26

- Then click on OK.

Step Eight:

- At “Date Time”, click on “Get” and the date and time of the amplifier will appear:

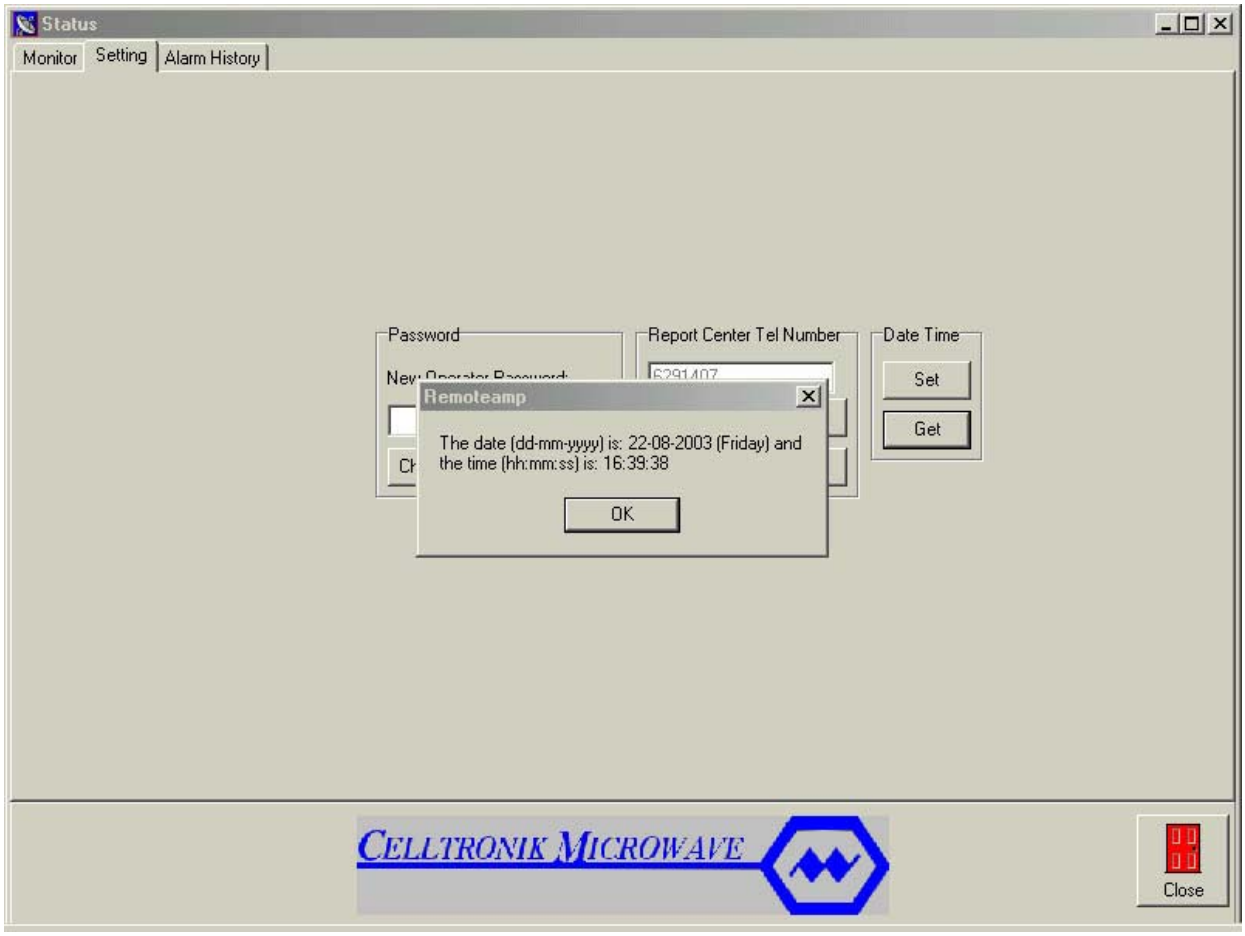


Figure 27

- To adjust the date and time of the amplifier, click on OK, the click on “Set”, the device will be set automatically according to the date and time of your computer.

- If you wish to check whether the modification has been done, click on “Get” again.

Step Nine:

- Click on “Alarm History” located on the upper left of the page.
- A list of the all the alarm reported will appear.

Note: The system will keep up to 56 alarms. If there are more than 56 alarms, the oldest ones will be deleted automatically.

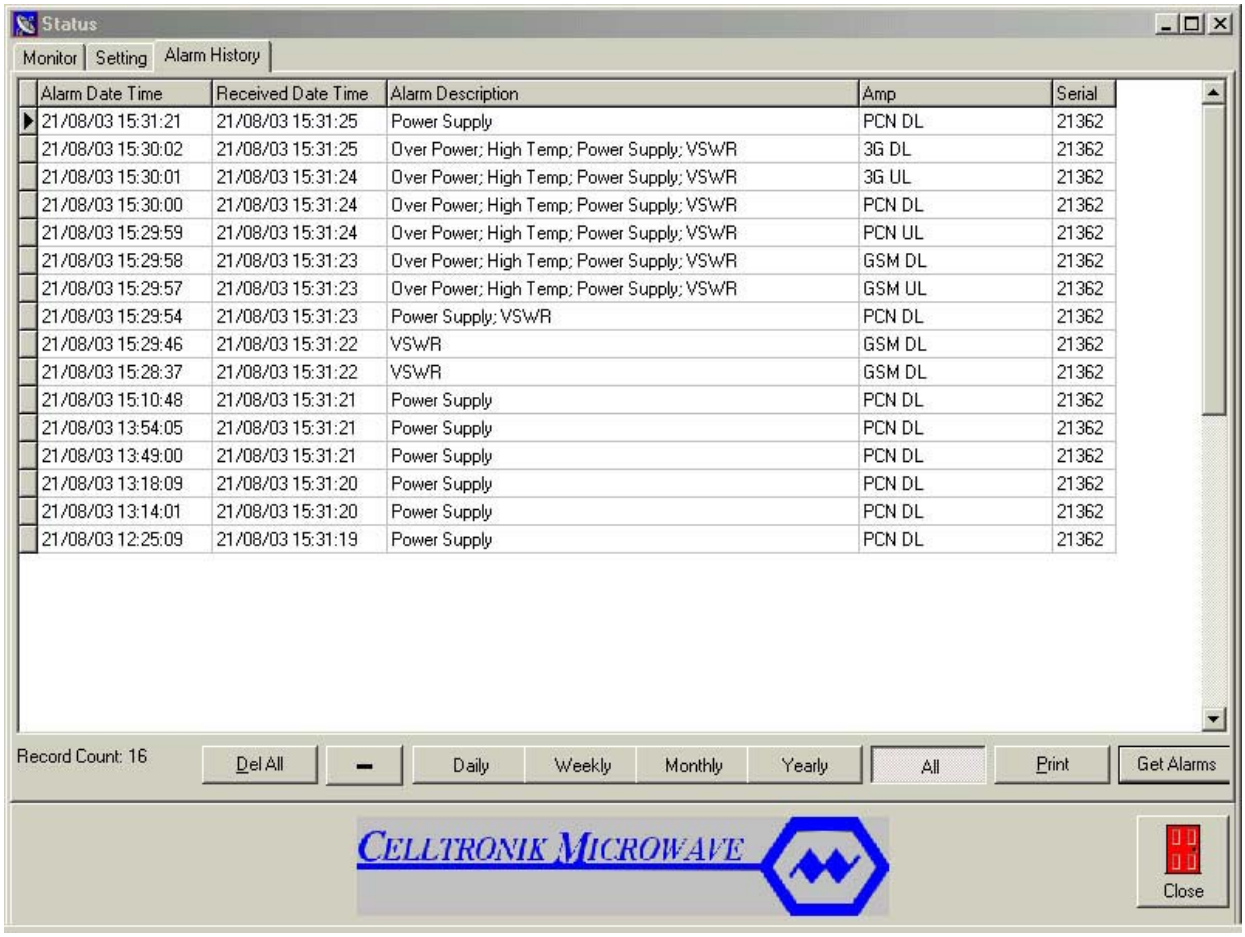


Figure 28

If the Report Centre is not standing by or the device is not set to active report alarm, no alarm can be received. In order to get the non-received reports, click on “Get Alarms”. (To activate Report Alarm, please see Section 10.)

Step Ten:

At the bottom of the report, you will see a bar, which allows you to select a periodic report of the problems.

For example, if you click the "Daily" button, only a daily report will be shown. If you click the "Weekly" button, a weekly report will be shown. You have a choice of either daily, weekly, monthly or yearly reports. However, you can also have access to all the problems reported by clicking the "All" button.

Step Eleven:

When the reported problems have been taken care off, and you do not wish to keep the data, click on either the  button to delete a particular alarm, or the "Del All" button to delete all the alarms reported.

If you wish to print a copy of the selected report, you can do so by clicking the "Print" button. When you are done with the report, you may return to the main menu by clicking the "Close" button.

Step Twelve:

Once you are done with the Status window, click "Close". It will bring you back to the "Amp" window. Make sure you either logout or return to the main menu by closing the "Amp" window. If you only cancel the connection without logging out or returning to the main menu, anyone can click on "Connect" and enter to the Status window without password, because yours is still in the memory.

From the "Amp" window, if you wish to return to the "Status" window, simply click on the "Status" button.

10 ALARM (Report Alarm)

When problems are detected, the amplifier s will automatically send the data to the control station, also called the Report Centre. The date and time when the data is received, the date when the problems occurred, the description of such and the identity of the device in which the problems occurred will be recorded in the "Reportalarm". However, in order to receive such report, the "Reportalarm" at the control station must be open, otherwise, the amplifiers will keep the report until the Report Centre is ready to receive.

This is the menu of the Reportalarm:

Figure 29

You see the Alarm button  , the Option button  and the Close button  . The Alarm button allows you to open the report.

The Option button allows you to choose the modem port of the Report Centre.

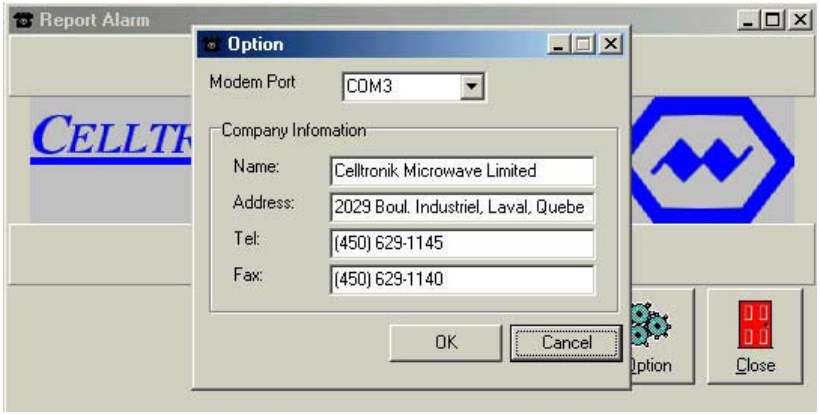


Figure 30

The Close button will simply close the Reportalarm.

For access to the report:

- Click on the  button, which open the following:

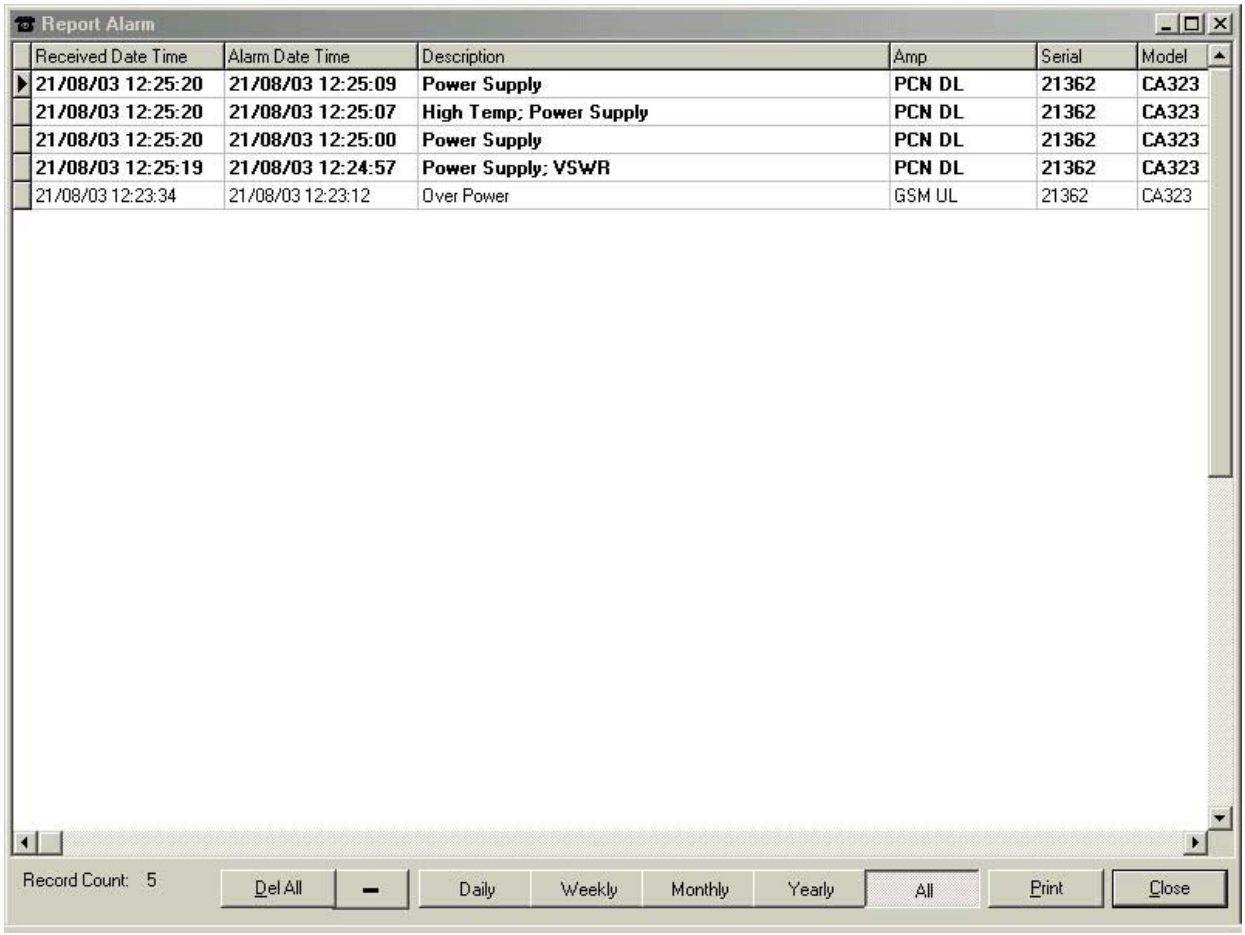


Figure 31

A list of the problems reported will be displayed with the unread alarms in bold characters. If you are already aware of a particular alarm, double-click on it and you will be asked to confirm, by which such characters will become normal, as shown below:

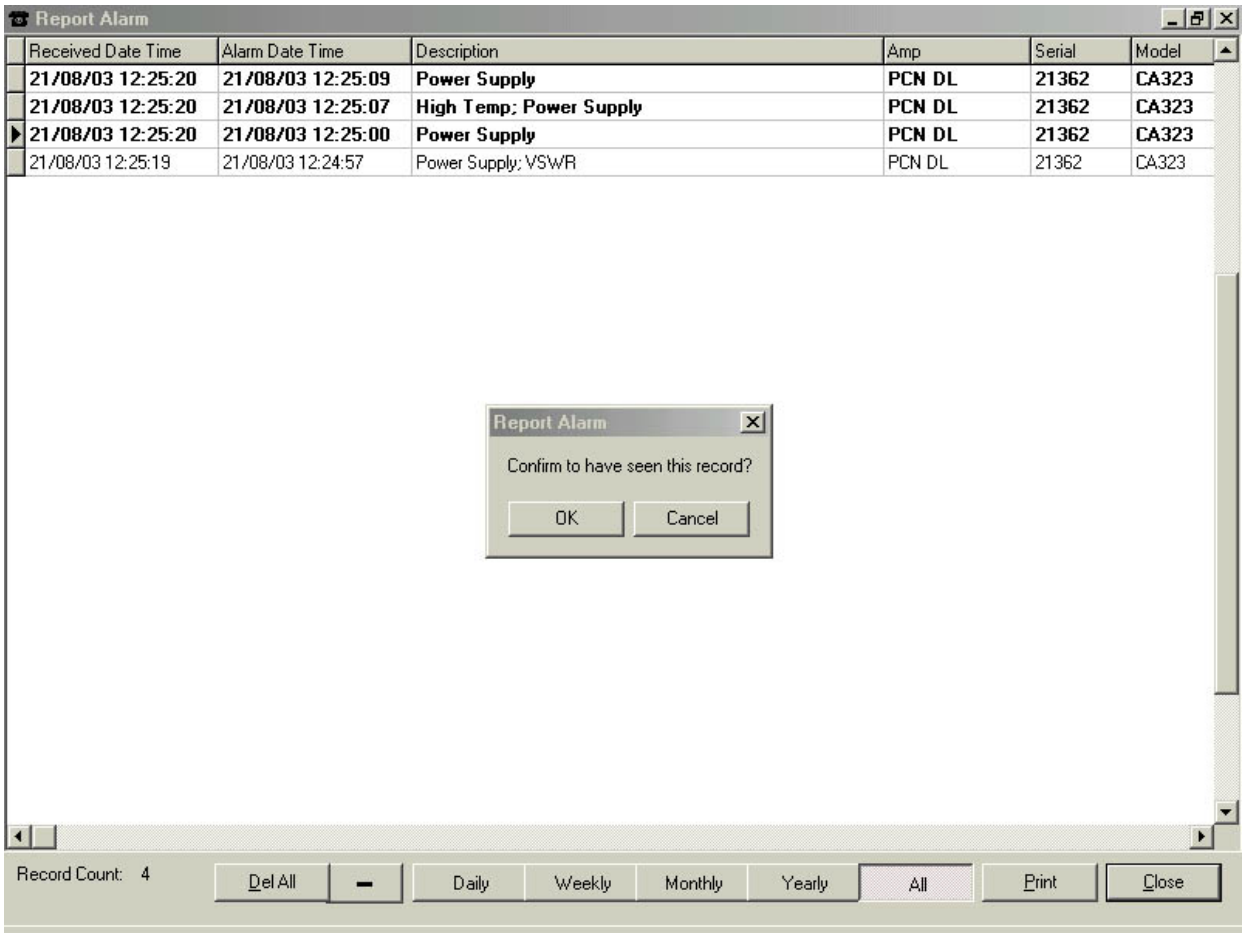


Figure 32

At the bottom of the report, you also have same periodic report and delete options as the Report History in the "Remote Access Amp" system. (Please refer to section 9.3.1, Step Ten and Step Eleven.)

** Once the alarms are deleted, they are not retrievable anymore. If you want to consult them, you have to go the Alarm History in the Status window of the Remoteamp.

11 Amplifier To Amplifier Link (ATA)

11.1 ATA System Overview

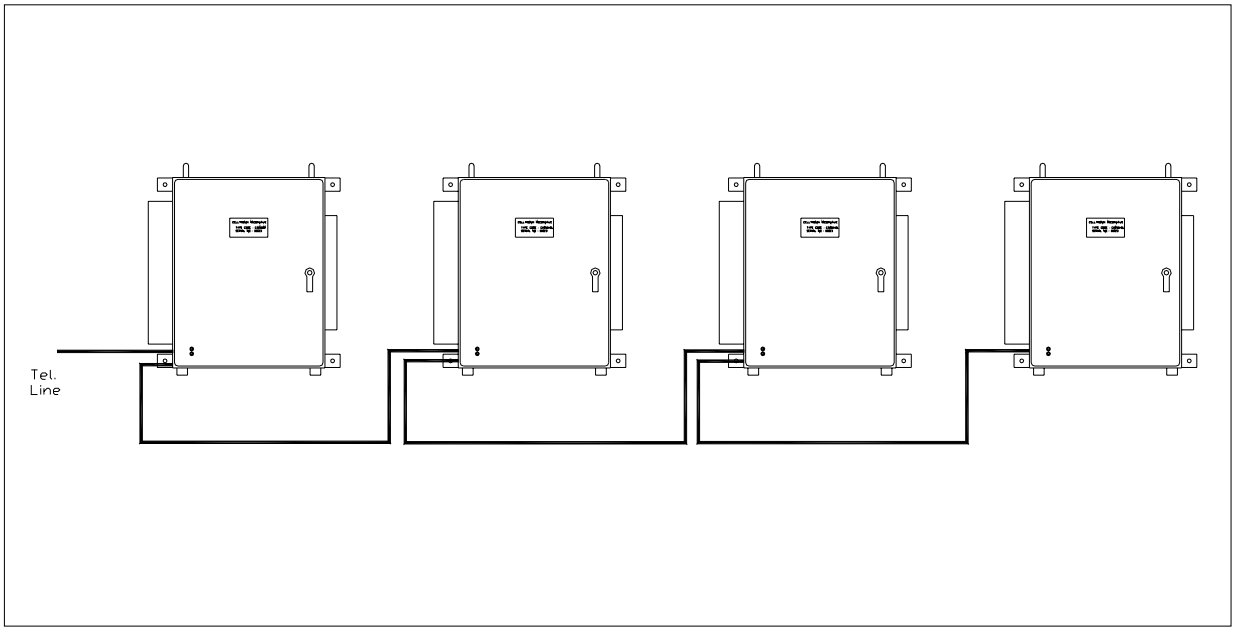


Figure 11.1 Amplifier to Amplifier Link

The Celltronik Amplifier to Amplifier Link can be used to establish a amplifier or repeater network with up to 31 amplifiers or repeaters, one of which can contain a phone line for communication with Celltronik OMS (RemoteAmp and ReportAlarm) software.

11.2 ATA installation

To be able to use the Amplifier to Amplifier Link feature, an ATA controller should be installed in one of Amplifiers within ATA net. Normally, an ATA controller and internal modem are already

installed in the Celltronik amplifier CAXXXXML series. In other word, this Amplifier which should be set to 'ATA Master' can be connected to telephone network and can also be simultaneously connected with other Amplifiers CAXXXXML series which should be set to 'ATA Slave' to establish an ATA net for communication with OMS software. The installation procedure of the ATA net is as follows:

i. Using a telephone cable to connect the internal modem to the telephone network.
ii. Release the screw cover of Cable glands of the Amplifier.

iii. Insert a telephone cable or twist pair cable (for long communication) through the cover and the cable gland.

iv. Pull the cable out from the cable gland inside the Amplifier cabinet.

v. Crimp a RJ-12 Plug (middle two contact only).

vi. Insert the plug into ATA2 socket of the CC813 controller.

vii. The other end of the cable should be connected to another amplifier which should be set to 'ATA Slave Mode'.

viii. The ATA2 socket of this Amplifier can be connected to another Amplifier with 'ATA Slave Mode'. A chain of amplifiers can be connected within an ATA net. See the figure 10.1.

ix. The maximum number of Amplifier within the ATA net is 32.

x. The polarity of the RJ-12 plug must be the same in the net.

xi. The Device Address of the amplifiers within the net should be set to different address.