Tech20040708-1-8
CELLWATCH: Fiber Optic Extender Set.

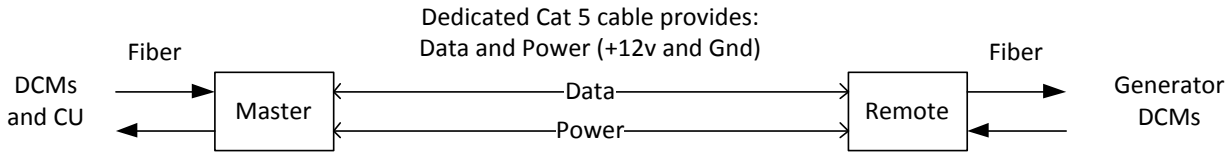
The purpose of the Fiber Optic Extender Set is to extend the fiber optic communications system used by the Cellwatch DCM modules beyond the 150 foot distance using copper wire. Most often this set is used to allow Cellwatch to monitor backup generator cells. The extender set consists of a number of components:-

1. A Master unit
2. A Remote unit
3. A short Auxiliary Power cable
4. A legacy Power cable
5. 2 DCM Ex Modules
6. DCM Accessory Kit (Fiber Optics, Rubber Boots, and Mounting accessories)

A Power Supply, (optional and sold separate)

How it works:

The fiber optic light signals are converted to RS-422 electrical signals by the Master unit. Using standard CAT5 Ethernet network cable with RJ45 connectors these signals are sent to the Remote unit. The Remote unit converts the RS-422 electrical signals back to the fiber optic light signals to communicate to the remote DCM unit(s), the returned optical signal is re-converted and transmitted back to the Master unit.



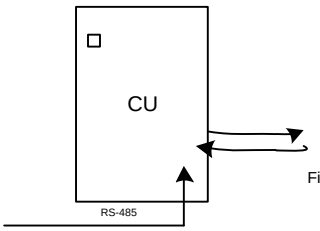
NOTE: Do not attempt to plug either of the components into an existing Ethernet Network. This component system uses standard Cat 5 cable and connectors but is NOT compatible with Ethernet Networks.

Powering the Units

The Master unit obtains its power from the Control Unit (CU) via the Auxiliary Power Connector (Conn 17) at the top left of the CU. A jumper cable is provided to convert the 3 pin Auxiliary Power (Conn 17) to the 4 pin connector for the Master unit.

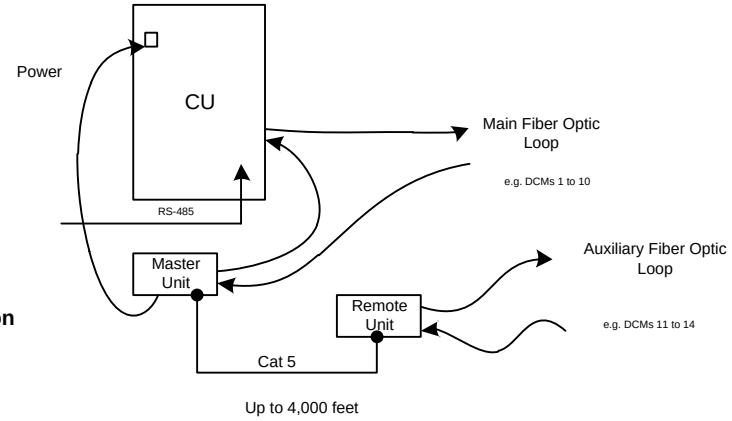
Green LEDs are located on the Master and Remote units to indicate that power is connected. Two Red LEDs will flash when communications packets are sent or received by the units.

Older legacy systems without this adaptor can use the RS-485 connection to access power from the CU using the supplied 4 pin adaptor cable.



Traditional Cellwatch Application

With single, local fiber loop.



Cellwatch Application with Fiber Optic Extender

With one or multiple, local and remote fiber loops

The Remote unit obtains its power from the Master unit by the Cat 5 cable. As depicted above, the Remote unit can be installed up to 4000 cable feet away from the master unit. The Master unit is typically installed inside or near the Control Unit. Temperature and Current of the remote units are not monitored using the fiber optic extender set.

Installation on CU's without Auxiliary Power Connectors

In legacy systems without the auxiliary power adaptor, power can be obtained from the four pin RS-485 connector inside the Control Unit. Here the Master is wired in series with the RS-485 communications to collect power from the Control Unit. A second 4-pin connection on the Master unit is provided to allow the continuation of the RS-485 communications to the Host computer (see the Legacy installation diagram below).

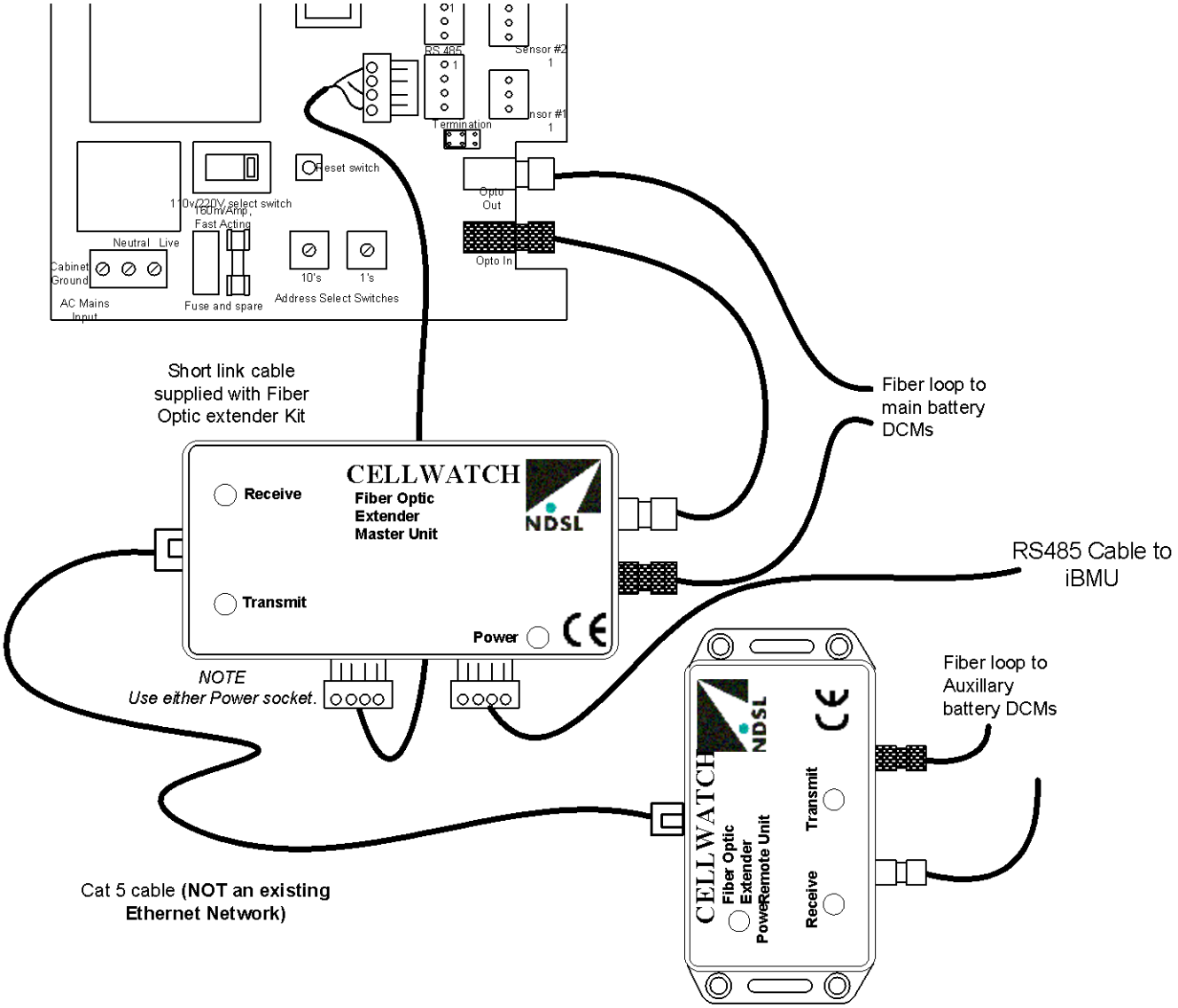
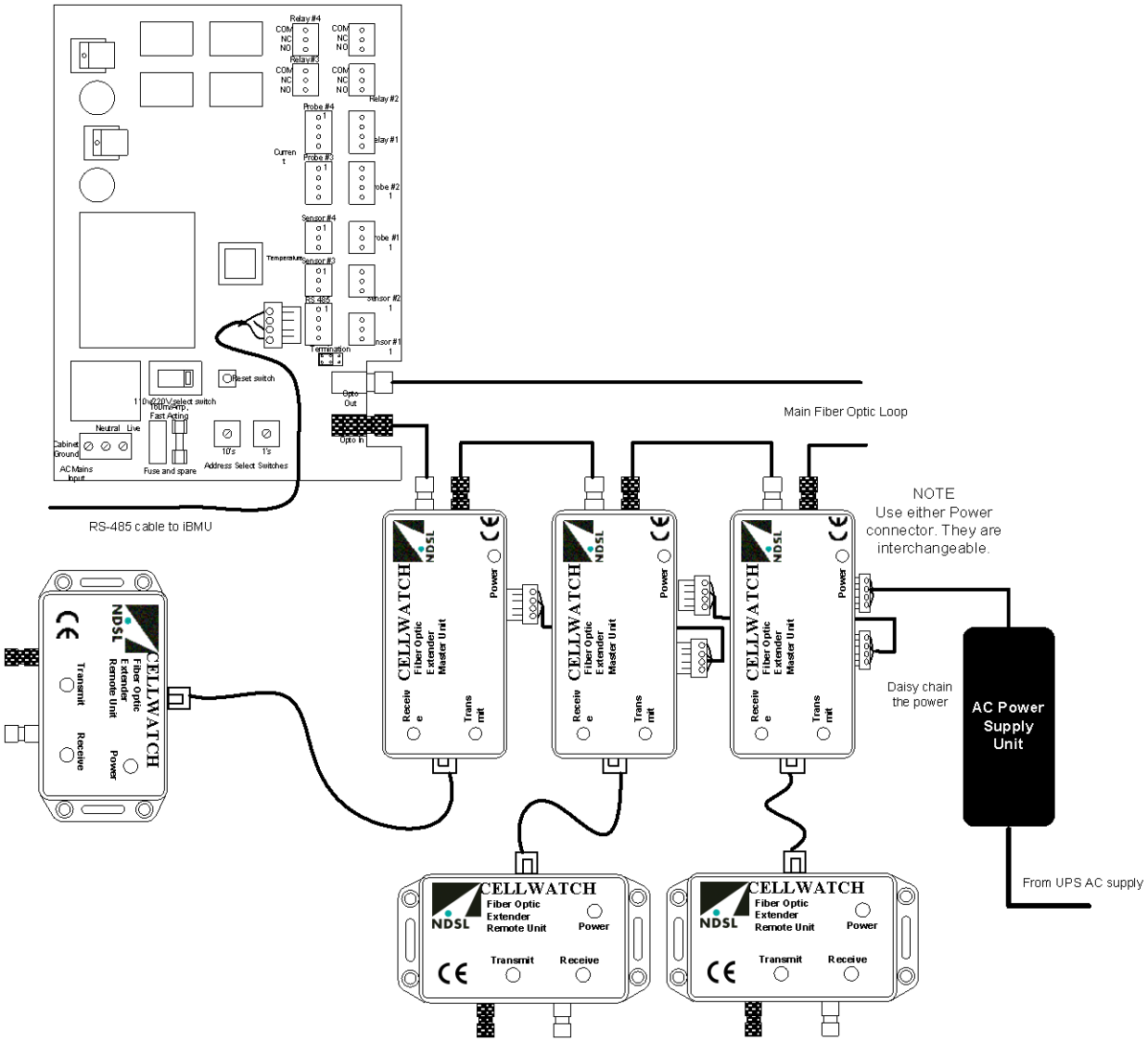


Figure 1 - Legacy Installations

Using an External Power Supply

In some instances the master unit may be installed away from the Control Unit and will require power from another source. An optional external power supply can be used to supply power up to four Master units. The optional external power supply should be connected to a UPS backed AC power outlet using the special connector supplied with the 4-pin supply. If a second Master unit is required, then this can be 'daisy chained' to the first Master unit using the short 4-pin to 4-pin jumper cable supplied with each kit (see below).

NOTE: The External Power Supply MUST be UPS backed. Failure to use a UPS backed outlet for the external power supply will result in a break in the Fiber Optic loop during a power outage.



Auxiliary Power Connection

The Remote Unit and Fiber Loop

The Remote unit of the Fiber Optics Extender obtains its power from the Master unit and does not require available power at the remote location. The fiber optics loop will run from the white connector of the remote to the first DCM Ex at the generator, switchgear, or substation, proceeding between DCM Ex modules back to the Remote unit.

The order of the DCMs in the Fiber Optic loop should match how the configuration file is built or configured. For instance, if the Generator DCM modules are configured on CU 2 before the UPS batteries are configured for CU 2, then Cellwatch will expect these DCMs to be at the start of the fiber loop.

For example, to put the extended DCM modules as the first units in the loop, the white output (transmit) fiber optic cable from the Controller would connect to the Master Unit's black receiver. The fiber optic loop is then continued at the remote module, through DCMs

and back to the master. The white output (transmit) fiber optic cable from the Master unit would then go out to the UPS DCM modules to continue the fiber loop.

To have the extended DCM modules at the end of the loop run the loop returning from the UPS batteries to the Master unit as described.

DCM Ex Modules and the Fiber Optic Extender

All Generator Extender or Fiber Optic Extender kits will come with the DCM Ex module. Unlike traditional UPS applications, generator cells react differently when when compared to the standard UPS battery; when starting a generator it is not uncommon for the voltage of the 12v jar to reach 3 volts or less due to the large current demands. The DCM Ex will continue to operate to 3.7 volts, compared to the DCM module that will operate to 6.7 volts. Using the DCM Ex on generator cells ensures that the fiber optic loop is more likely to remain functional when these cells temporarily drop in voltage.

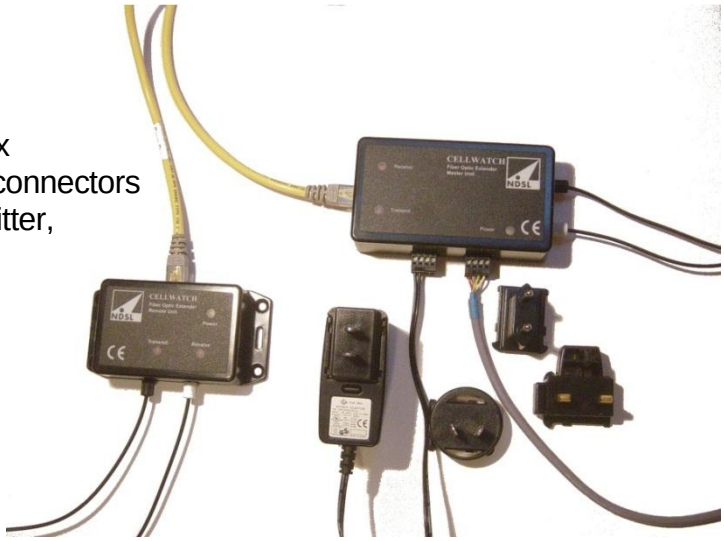
If additional DCMs are required to monitor additional generators and/or generator cells, it is highly recommended that DCM Ex modules be purchased instead of the DCM module. Follow best practices for installation of DCM modules as recommended by the Cellwatch Installation and User Manual and as outlined in Tech20040616 Cellwatch Measurement of Two Parallel Strings of 2 jars.

Troubleshooting

Troubleshooting the Fiber Optic extender over 4000 feet of dedicated Cat5 cable can be quite cumbersome. Our recommendation is to use a smaller 3-6 foot Cat5 cable to connect the master and remote modules. A small piece of fiber optic cable can be used to jump the remote unit white and black connectors (completing the fiber loop) for easy testing. Most often problems in communications with an extender set are due to miss wires or disconnects in customer terminated Cat5 cables. Technical Support is available to assist troubleshooting over the phone should they be needed.

Master unit:

Size	4.4” X 2.4” X 1.25”
Case:	High impact FRABS plastic
Power:	12 volts +/- 10% at 100 mA max
Connectors:	4 pin Power/485 pass through connectors Fiber optic receiver and transmitter, Cat 5 cable to Remote unit
Temperature:	Storage: 25 to 85C Operating: 0 to 40C
Humidity:	0 to 95% non-condensing



Indicators

1. Green power LED
2. Red LED for transmit and receive data

Remote unit:

Size:	3.3” x 2.2” x 1.0”
Case:	High impact FRABS plastic
Power:	Provided by Master Unit
Connectors:	Fiber optic receiver, Fiber Optic transmitter, and Standard Cat 5 cable to Remote unit
Temperature:	
Storage:	25 to 85C
Operating:	0 to 40C
Humidity:	0 to 95% non-condensing
RS-422 (Cat5) range:	4000 feet
Fiber optic range:	150 feet, radius no sharper than 5”

NOTE: Use only Standard Cat5 cable. Do not use Cat5 Crossover type cable that is supplied with every iBMU.

Indicators

1. Green power LED
2. Red LED for transmit and receive data

External Power supply:

Input AC range:	90 to 264 VAC 47 to 63 HZ
Output voltage:	12 volts +/- 5%
Output current:	420 mA
Max number of units:	4 sets of extenders

NDSL

This application note is subject to change without notice.

Visit www.cellwatch.com for the latest contact information for NDSL and Cellwatch Technical Support.