



Productivity and Safety through
Mine-Spec digital applications

VDV

leaky feeder
radio system



Robust

VHF underground radio system

Multi-channel functionality

Reliable radio communications

Applications

UNDERGROUND MINES
HARD ROCK MINES
TUNNELS
BLASTING
VOICE COMMUNICATIONS
DATA TRANSMISSION

MST Global (MST) VDV leaky feeder radio system delivers a reliable, easy to maintain two-way radio system for the underground mine. The productivity and safety benefits associated with a VDV installation make VDV a cost effective solution to underground communication and telemetry requirements.

The VDV system provides eight and sixteen expandable channels, allowing for system expansion in blocks of eight channels as needs grow. Additionally, the MST VDV system is virtually noise free and is impervious to HV power or other electrical interference.

For optimal communication, the VDV system has duplex voice telemetry and is data capable, ensuring it is capable of both voice and data communication on all channels, simultaneously, and allowing telemetry control of remote equipment. Unlike

other systems, VDV can be used for full telemetry control of underground equipment. MST's experience in designing and installing telemetry systems, at a range of mines globally ensures the system will operate as specified.

Infinity 2 Diagnostics for local and remote PC-based diagnostics allows mine personnel to view the system condition and each amplifier from the comfort of the office or workshop. The system reports on RF levels and voltages present.

Every active device in the distribution system is fitted with an in-built DC voltage regulator and filter. This enables the amplifier chain to compensate for voltage irregularities throughout the system.

The VDV system is an incredibly reliable, functional, and for many mines, indispensable communications pathway.

Features and Benefits

TOTAL COMMUNICATIONS

- The high reliability and quality of the VDV Leaky Feeder ensures voice and data communication will enhance any operation

TUNNELS

- The simplicity of installation will mean VDV can provide a powerful project management tool
- Two way voice communication between tunneling crews and loco drivers etc, and data logging from, for example, TBMs throughout the tunnel length will assist in the tunnel development and be available for use by the tunnel operator, if required

MINES

- VDV provides two-way communication for voice and data requirements. The true multi-channel performance ensures the optimum combination of voice and data signalling can be achieved to better manage the mine

BLASTING

- BlastPED allows for remote blasting commands to be sent through the VDV Leaky Feeder System. The same proven safety protocols as used in the PED version are utilised in the VDV version

VDV built by MST for the modern mine

The VDV system has been specifically designed and manufactured by MST for underground mine application. This ensures it allows for excellent levels of support.

The Headend distribution panel is fitted with four output feeders, each of which is capable of driving a minimum of 5km of feeder without the need for additional supply units.

The VDV system has been design to ensure compatibility with most existing systems. Allowing for maximum flexibility of use, the amplifiers have been designed to perform equally as well with other suppliers' systems, not just those provided by MST. This allows customers to source VDV equipment to suit an existing system.

VHF Radios are available as stationary (base), hand-held (portable), vehicle-mounted (mobile), integrated with CapLamp batteries or radio-modem (data applications). Radios support multiple channels and can be configured to interface with telephone systems. Trunked voice radio is cost-competitive when 200 or more radios are used on-site. Trunked systems also provide "private" voice conversations.

Automatic Gain Control (AGC) allows the system to be unbalanced and still operate to maximum specification. Even if the cable attenuation is inconsistent, this is achieved by either down-link or up-link pilots tones, or a combination of both.

MST prioritised the use of modular amplifier construction specifically to save time. Due to the amplifiers being modular in construction, the time savings during installation and service are greatly increased, meaning less down-time and more production time.

The depth of experience in building systems for the underground mine environment ensured that MST included submersible housings and terminations as a part of the VDV design. The amplifiers have been designed for the harshest of environments, from high pH levels to extremely dusty and wet exposure. The amplifiers and terminations are submersible up to one metre. The amplifiers are also RF shielded for protection in electrically noisy environments.

Coaxial amplifier terminators have also been included to negate the need to expose the amplifier during installation. Having bolt on submersible connectors eliminates exposed cable within the amplifier enclosure.

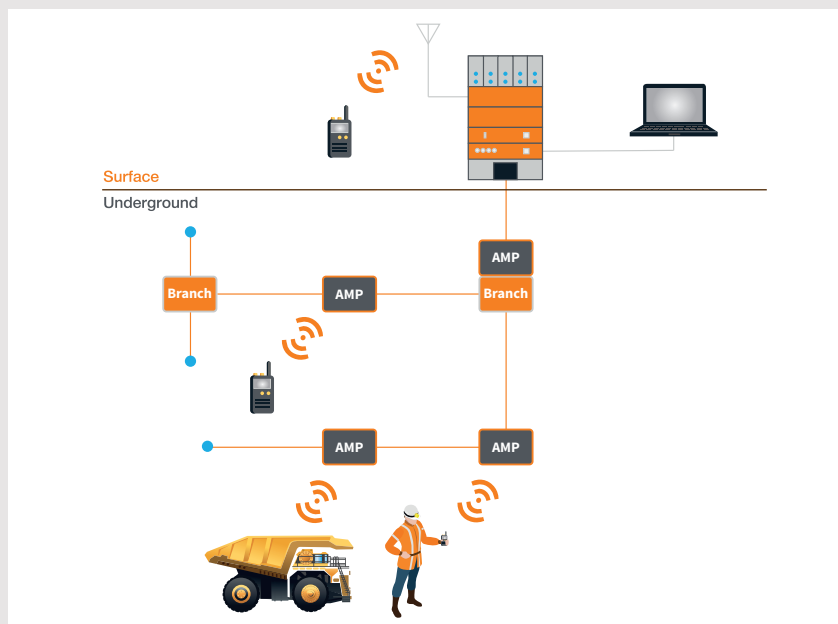


Fig1. VDV Layout. Example of a typical MST leaky feeder network installation.

HEADEND DISTRIBUTION PANEL

- 4 output feeders
- Each feeder capable of driving a minimum of 5km of leaky feeder cable
- No need for additional supply units within 5km
- Supports any standard, readily available radio unit working in the specified passband



LINE AMPLIFIER

- Easily used with different supplier systems
- Submersible to 1m
- Resistant to high pH levels, extreme dust and exposure to moisture
- RF shielded for protection in electrically noisy environments



LINE AMPLIFIER WITH BRANCH

- Branch units, placed in the line, split the signal
- Placed at a level and ore drive intersections
- Maintain balance in the leaky feeder system



COAXIAL CABLE

- Coaxial cable terminators negate the need to expose amplifier during installation
- Bolt-on, submersible connectors eliminates exposure
- Leaky Feeder cable is a Radio Frequency cable with weak shielding which allows radio signals to enter or leave the cable at any point.



TECHNICAL SPECIFICATIONS

VDV HEADEND UNIT SPECIFICATIONS

CHANNEL CAPACITY (VOICE/DATA)

Combiner 8 channel increments

Combiner Splitter 16 channel

INSERTION LOSS

Tx. Junction to Leaky Feeder 38dB max

Leaky Feeder to Rx. Junction 23dB max

RF DRIVER LEVELS

RF Driver Level @ Tx. Port +40dBm

RF Signal Level @ Leaky Feeder +2dBm

CONNECTIONS

Rx. Junction Connection TNC Female

Tx. Junction Connection TNC Female

Leaky Feeder Connection "N" Female

IMPEDANCES

Rx. Junction Connection 50 ohms

Tx. Junction Connection 50 ohms

Leaky Feeder Connection 75 ohms

ISOLATION

Between Rx. Ports 20dB min

Between Tx. Ports 20dB min

PILOT TONE GENERATORS

CHAIN PILOT GENERATOR (AGILE)

Direction Optional as Uplink or Downlink

Operating Frequency PC Adjustable in 12.5 KHz steps

DIAGNOSTICS CIRCUITRY (AGILE)

Operating Frequency 168-186 MHz PC Adjustable in 12.5 KHz steps



LINE AMPLIFIER UNIT SPECIFICATIONS

Frequency Band VHF Spectrum

Frequency Split 9.5 MHz

Pass Band

- 177 MHz \pm 9 MHz (Uplink - return path)
- 152 MHz \pm 7 MHz (Downlink - forward direction)

Amplifier Gain 22dB nom (forward and return)

Construction Surface Mount Tech

Gain Adjustment Auto (AGC)

AGC Range 20dB

In/Out Impedance 70ohms

Suggested Amplifier Separation 350 metres

Third Order Intercept

- Forward 15dBm
- Return 16dBm
- 7 - 32 volt DC

Maximum Line Current 5 amperes

Power Consumption 1.2 watts

Nominal RF Input Level

- Forward -15dBm
- Return -16dBm

NOMINAL CURRENT

Amplifier Module (VCC = 5 VDC) 100 mA typ

RF LEVELS

Base Port O/P Level

- Return 0dBm max.
- Forward 1dBm max

ENCLOSURE

Construction Submersible Cast CATV

Size 6in x 3.5in x 2.5in (130mm x 90mm x 60mm)

Termination CATV through-pin connector



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